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Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

MERRITT LYNDON FERNALD, Editor-in-Chief

CHARLES ALFRED WEATHERBY
ALBERT FREDERICK HILL
STUART KIMBALL HARRIS
} Associate Editors

VOLUME 50

1948

The New England Botanical Club, Inc.
8 and 10 West King St., Lancaster, Pa.
Botanical Museum, Oxford St., Cambridge 38, Mass.

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Vol. 50. January, 1948. No. 589

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Races of Braya Humilis, × 2/3

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 50. **January, 1948.** **No. 589.**

BRAYA IN BOREAL EASTERN AMERICA[1]

ERNST C. ABBE

(Plates 1088–1090)

The genus *Braya* is based on a species of the Carinthian Alps, *B. alpina* Sternberg and Hoppe.[2] A number of species have since been recognized in various parts of the world, the first summary treatment for North America being that by Hooker.[3] No recent treatment of the genus in boreal eastern America has been attempted. Therefore the writer has undertaken this as best he could without the benefit of the European types. It is expected that a careful checking of the type of at least *Braya glabella* may lead to modifications of nomenclature.

Individuals within the species of *Braya* are able to survive and reproduce under the most adverse circumstances. There follows upon this a familiar but nevertheless confusing intraspecific morphological variability, not only in the vegetative structures but

[1] Contributions from the Herbarium of the University of Minnesota, No. VI.

The materials presented in this paper were largely gathered during the writer's tenure of a John Simon Guggenheim Foundation Fellowship, 1941–42, at the Gray Herbarium, Harvard University. In the completion of this paper, support has been provided by the Graduate School, University of Minnesota, which has granted the writer a Faculty Summer Research Appointment, 1947.

The writer is indebted to the Curators of the following herbaria for the loan of specimens in their care: Gray Herbarium, Harvard University (G); U. S. National Herbarium (N); Philadelphia Academy of Natural Sciences (P); Herbarium of the Carnegie Museum, Pittsburgh (D); National Herbarium of Canada (O); Herbarium of the College of Agriculture, Cornell University (C); Herbarium of the New York Botanical Garden (B); Herbarium of the University of Minnesota (M). The letter after each of the above will be used in identifying specimens cited from the collections of these institutions.

[2] Denkschr. Bot. Ges. Regensburg **1**: 65–75. 1815.

[3] W. J. Hooker, Flora Boreali-Americana, vol. 1, 65–66. 1840.

even in the siliques. Within a single collection of a foliose species, such as *B. linearis* Rouy of Scandinavia and Greenland, one will find well-developed individuals with leafy stems, as well as individuals which are so reduced as to be scapose; nevertheless all are flowering and fruiting. Depauperate individuals may be identifiable if in the fruiting stage, but if they are in flower they present the greatest difficulty. Leaf-characters in reduced individuals are also misleading since the leaves may be practically linear and entire, whereas under more favorable circumstances leaves in the same species will be characteristically oblanceolate and with several evident teeth on each margin. It is obvious then, that depauperate plants wholly in flower will be difficult or impossible to place satisfactorily unless they are associated with fruiting plants from the same clone. A detailed description of variability within a single limited population as observed at Richmond Gulf is given below under *B. purpurascens*.

KEY TO BRAYA IN BOREAL EASTERN AMERICA

(Note: the statements below apply only to well-developed plants)

1. *Stems foliose*[4], the stem-leaves sometimes with axillary tufts of leaves; *basal leaves and bracts not infrequently with several teeth*
   2. *Sepals caducous; fruiting branches arising from axis of the year;* usually more than 10 seeds on one side of the dissepiment; mature siliques (from middle of the inflorescence) usually 15 mm. or more long and 0.7–1.0 mm. wide; fruiting inflorescence loose; plants with several stems which may be arcuate-ascending ..... *1. B. humilis*
   2. *Sepals persistent; fruiting branches never arising from axis of the year;* usually fewer than 10 seeds on one side of the dissepiment; mature siliques (from middle of the inflorescence) usually less than 15 mm. long and 1–1.4 mm. wide; fruiting inflorescence tending to be congested above; stems erect ..... *2. B. linearis*
1. *Stems scapose*, the scapes occasionally with foliose bracts but then with a flower or fruit in the axil of each; siliques usually more than 1.4 mm. wide, but if narrower then less than 6 mm. long; *the basal leaves and bracts* (if present) *usually entire*, rarely with one or two teeth
   3. Siliques ovate-elliptic to elliptic-oblong, torulose when elongate, seeds in two rows ..... *3. B. purpurascens*
   3. Siliques lance-subulate, not torulose, the few seeds crowded into one row
      4. Petals 4–5 mm. long and 1.5–2 mm. wide, the siliques glabrous; limb of the petal bright white, claw blue-violet ..... *4. B. Longii*
      4. Petals 3–4 mm. long and 1–1.4 mm. wide, the siliques hirtellous; petals uniformly lilac to pink, fading to white ..... *5. B. Fernaldii*

[4] Depauperate individuals may be scapose, but can sometimes be recognized as belonging to this group by their narrow siliques (1.4 mm. or less).

1. Braya humilis (C. A. Meyer) B. L. Robinson in Gray, Synopt. Flora N. A., **1**, pt. 1, 141 (1895). *Sisymbrium humile* C. A. Meyer in Ledeb. Ic. pl. ross. **2:** 16 (1830). *Torularia humilis* (C. A. Meyer) O. E. Schulz in Limpricht, Fedde Rep. Beih. **12:** 390 (1922).

A notable series of isolated occurrences characterize *B. humilis*, especially in eastern North America. There is an East Greenland population (Plate 1089, fig. 1) quite separate from a much-restricted West Greenland occurrence (Plate 1088, fig. 3). No specimens from the mainland of the Labrador peninsula (which is, of course, known primarily from coastal exploration) have come to the writer's attention. In the Gulf of St. Lawrence it appears again on Anticosti Island (Plate 1088, fig. 4), and in one area (Table Mt.) in Newfoundland (Plate 1088, fig. 5). The southernmost occurrence is on Willoughby Mountain in Vermont (Plate 1088, fig. 1). Moving westward, there are stations on the west and south of James Bay and on the near-by southern shore of Hudson Bay (Plate 1088, fig. 2). There is a major gap between these eastern occurrences and the stations in or near the Rocky Mountains. To the north there are scattered records from Fort Simpson and northward, and in Alaska. To what extent the major areas in the west are natural can be determined only after more thorough collecting has been done. However there has been sufficient collecting on the coasts of Greenland, and of the Labrador peninsula, about the Gulf of St. Lawrence and throughout New England to make it reasonably certain that the populations there are notably restricted.

In studying the variation within this species a number of characters were checked on some 130 sheets of specimens. These characters were habit, margins of basal leaves, pubescence of the silique, nature of the stigma, and the dimensions of the style, of the body of the silique, of the pedicel and of the petals and sepals. It is evident from the key which follows and from the descriptions for each of the geographic races that there is overlapping of all characters to such an extent that it would be unjustifiable to propose them as varieties or perhaps even as forms. They are treated therefore as numbered races, even though their distribution is disjunct.

The following key summarizes the average set of characters about which each of these geographic races varies.

THE GEOGRAPHICAL RACES OF B. HUMILIS IN EASTERN NORTH AMERICA

1. Styles of mature fruits short (0.2–0.7, aver. 0.3–0.4, mm. long); stigma in fruit not capitate; siliques glabrescent to moderately pubescent, the silique from 0.9–1.2 (aver. 1.0) mm. wide. . . . . Race 1 (East Greenland)
1. Styles of mature fruits long (0.3–1.2, aver. 0.7–1.0 mm.)
  2. Pedicels of lowermost fruits 2.0–9.0 mm. long
    3. Siliques moderately pubescent to glabrescent, stigmas moderately capitate or not capitate
      4. Pedicels 3–6 (aver. 4.3) mm. long, siliques 0.6–0.7 mm. thick. . . . . Race 6 (southern Hudson Bay)
      4. Pedicels 2–4 (aver. 2.7) mm. long, siliques 0.7–1.0 mm. thick. . . . . Race 3 (Anticosti Island)
    3. Siliques glabrescent, stigmas markedly to moderately capitate
      5. Siliques 0.7–0.8 (aver. 0.7) mm. thick; habit moderately erect (rarely strict); petals (dry) 3.2–4.2 (aver. 3.6) mm. long; basal leaves mostly deeply toothed Race 5 (New England)
      5. Siliques 0.8–1.0 (aver. 0.9) mm. thick; habit strict (rarely moderately erect); petals (dry) 2.6–3.6 (aver. 3.2) mm. long. . . . . Race 2 (West Greenland)
  2. Pedicels of lowermost fruits 1–2 (aver. 1.6) mm. long, stigmas not capitate, plants markedly dwarfed Race 4 (Newfoundland)

RACE 1. Plants moderately erect. Fruit relatively thick, 9–16.5 mm. long, 0.9–1.2 mm. wide, glabrescent to moderately pubescent; style short (0.2–0.5 mm.), not capitate; pedicel of lowermost fruit 2–5 mm. long. Petals (dry) 3–4.2 mm. long, 1.2–2.0 mm. wide. Sepals (dry) 2.0–3.4 mm. long, 1.0–1.4 mm. wide. East Greenland. PLATE 1089, FIG. 1.—EAST GREENLAND: dry "Fjaeldmark", northwest coast of Clavering Island, 74° 25′ N, 24/7, 1929, *G. Seidenfaden* 84 (B); south side of Jordan hill, 74° 07′ N, 27/7, 1930, *Seidenfaden* 799A (B); dry "Fjaeldmark", Stronberg Penin., Geolog Fjord, 73° 48′ N, 18/8, 1929, *Seidenfaden* 364 (B); head of Franz Joseph Fjord, 73° 10′ N, 27. VIII. 1929, *Seidenfaden* 523b (O); "Fjaeldmark", Suess Land, Kempe Fjord, 72° 53′ N, 20/8, 1929, *Seidenfaden* 462 (B).

RACE 2. Plants strict, or sometimes moderately erect. Fruit moderately thick (12–17 mm. long, 0.8–1.0 mm. wide), glabrescent; style fairly long (0.6–1.0 mm.), markedly capitate; pedicel of lowermost fruit 3–5 mm. long. Petals (dry) 2.6–3.6 mm. long, 1.0–1.6 mm. wide. Sepals (dry) 2.0–2.6 mm. long, 0.9–1.4 mm. wide. West Greenland. PLATE 1088, FIG. 3.—WEST GREENLAND: Itivdleq-Fjord, Qingua, 66° 29′ N., Jul. 6, 1926, *M. P. Porsild, s. n.* (G, N, O); same locality, 4.8. 1914, *M. P. & A. E. Porsild, s. n.* (G, N, O, M).

RACE 3. Plants moderately erect or sometimes strict, tall. Fruit long (13–23 mm. long, 0.7–1.0 mm. wide), moderately pubescent; style variable in length (0.4–1.2 mm.), stigma moderately capitate to not capitate; pedicel of lowermost fruit short

(2–4 mm.). Petals (dry) 3.2–4.0 mm. long, 1.2–1.8 mm. wide. Sepals (dry) 2.0–2.9 mm. long, 1.0–1.4 mm. wide. Anticosti Island. PLATE 1088, FIG. 4.—QUEBEC: gravelly bed of Jupiter River, Anticosti, Aug. 18, 1883, *Macoun* 12 (G); along rivers and on gravel, Jupiter River, Anticosti, Aug. 18, 1883, *Macoun* (335.113) 2086 (O); Anticosti, P. Q., Aug. 23, 1883, *Macoun s. n.* (N); platières de l'embouchure, Rivière Jupiter, Anticosti, Aug. 11, 1926, *Marie-Victorin & Rolland-Germain* 24,849 (G, N, P, O); sur les platières, Rivière du Brick, Anticosti, Jul. 23, 1927, *Marie-Victorin & Rolland-Germain* 27203 (G, N, P, O).

RACE 4. Plants moderately erect, or sometimes strict, very short. Fruit very short (12–14.5 mm. long, 0.8–0.9 mm. wide), moderately pubescent; style fairly long (0.6–1.0 mm.) and not capitate; pedicel of lowermost fruit very short (1.0–2.0 mm. long). Petals (dry) 3.0–4.0 mm. long, 0.8–1.5 mm. wide. Sepals (dry) 1.8–2.4 mm. long, 0.8–1.2 mm. wide. Newfoundland. PLATE 1088, FIG. 5.—NEWFOUNDLAND: dry exposed ledges and shingle on the limestone tableland, altitude 200–300 m., Table Mountain, region of Port à Port Bay, July 16 & 17, 1914, *M. L. Fernald & H. St. John* 10837 (G, N, B, C).

RACE 5. Plants moderately erect or sometimes strict. Fruit long and narrow (14–20 mm. long, 0.7–0.8 mm. wide), glabrescent; style long (0.7–1.2 mm.), stigma moderately capitate; pedicel of lowermost fruit long (3–7 mm.). Petals (dry) 3.2–4.2 mm. long, 1.0–1.6 mm. wide. Sepals (dry) 2–2.8 mm. long, 0.8–1.4 mm. wide. Vermont. PLATE 1088, FIG. 1.—*B. humilis* var. *leiocarpa* (Trautv.) Fernald, Rhodora **39:** 276 (1937).—VERMONT: gravelly shelves of cliffs, Bald Mt., Westmore, Aug. 8, 1929, *A. S. Pease* 21055 (G); Willoughby Mt., 1866, *H. Mann, s. n.* (G); Willoughby Mt., no date, *H. Mann, s. n.* (C); Willoughby Mt., Jul. 19, 1880, *C. G. Pringle, s. n.* (G, N, B); moist alpine cliffs, Willoughby Mt., Westmore, VII—2—1894, *A. J. Grout & W. W. Eggleston, s. n.* (G, N, B, P, C).

RACE 6. Plants moderately erect to strict. Fruit long and narrow (15.5–18.0 mm. long, 0.6–0.7 mm. wide), moderately pubescent; style long (0.7–1.2 mm.), moderately capitate to not capitate; pedicel of lowermost fruit 3–6.0 mm. long. Petals (dry) 3.0–5.0 mm. long, 1.0–2.4 mm. wide. Sepals (dry) 2.2–3.4 mm. long, 0.8–1.4 mm. wide. Southern Hudson Bay and James Bay. PLATE 1088, FIG. 2.—ONTARIO: sandy river banks, Moose Factory, Jul. 3, 1929, *A. E. Porsild* 4636 (O); clearing, N. E. end of Moose Island, Moose River, Jul. 3, 1929, *D. Potter* 541 (G); Moose Island, 2½ mi. E. of Moosonee, Moose River, 7/9/35, *M. T. Doutt* 2239 (D); river bank, opposite Allen Island, Abitibi River, June 30, 1929, *D. Potter* 542 (G); 60 miles up Kapiscow R., w. coast of James Bay, July 1902, *W. J. Wilson* 54009 (O); mouth of Equam R., James Bay, July 9, 1901, *D. B. Dowling*

34,555 (O); gravelly banks, Severn River, Keewatin, July 29, 1886, *J. M. Macoun* (G *s. n.*, O no. 2087).

2. B. LINEARIS Rouy, Illustr. Pl. Eur. Rar. **9**, p. 84; Rev. Bot. Syst. Geog. Bot. **1**, p. 76 (1903).—*B. alpina* of authors, not Sternberg and Hoppe. *B. glabella* of authors, probably not Richardson. *B. purpurascens* of authors, not (R. Brown) Bunge.[5]—EAST GREENLAND: dry soil, south side of Jordan hill, 74° 07′ N., 27/7, 1930, *G. Seidenfaden* 799-B (B); "Fjaeldmark", on the south coast of Andree Land, 73° 18′ N., 19. VIII. 1929, *Seidenfaden* 434b (O, B); sandy slopes, head of Fr. Joseph Fjord, 73° 11′ N, 27/8, 1929, *Seidenfaden* 523 (B); Ella Island, Cape Oswald, 72° 53′ N, *Thorv. Sørensen*, 3577a (O). WEST GREENLAND: Ingnerit Fjord, Magdlâq, 12–13 Jul., 1929, 71° 7′ N, *M. P. & R. T. Porsild, s. n.* (N, G); Ingnerit Fjord, Tasiussaq, 71° 3′ N, 13 Jul. 1929, *M. P. & R. T. Porsild, s. n.* (G).

Nordhagen has drawn attention to Schulz's conclusion[6] that the Greenland material which has often passed as *B. glabella*, is *B. linearis*. Nordhagen's discussion[7], being in Norwegian, is not readily accessible and is worthy of presentation in translation.

"Another controversial species is *Braya linearis* Rouy. The Scandinavian plant was originally called *B. alpina* Sternb. & Hoppe; but, as shown by several investigators, the middle European plant of this name is distinctly different from the Scandinavian. Rouy described the latter as *B. linearis*, nova species. In the meantime Gelert in 1898 had already asserted that the Scandinavian species was identical with an Arctic-American species, *B. glabella* Richards., of which there are specimens in British herbaria. In 1921 C. Alm introduced this name in Scandinavian literature.

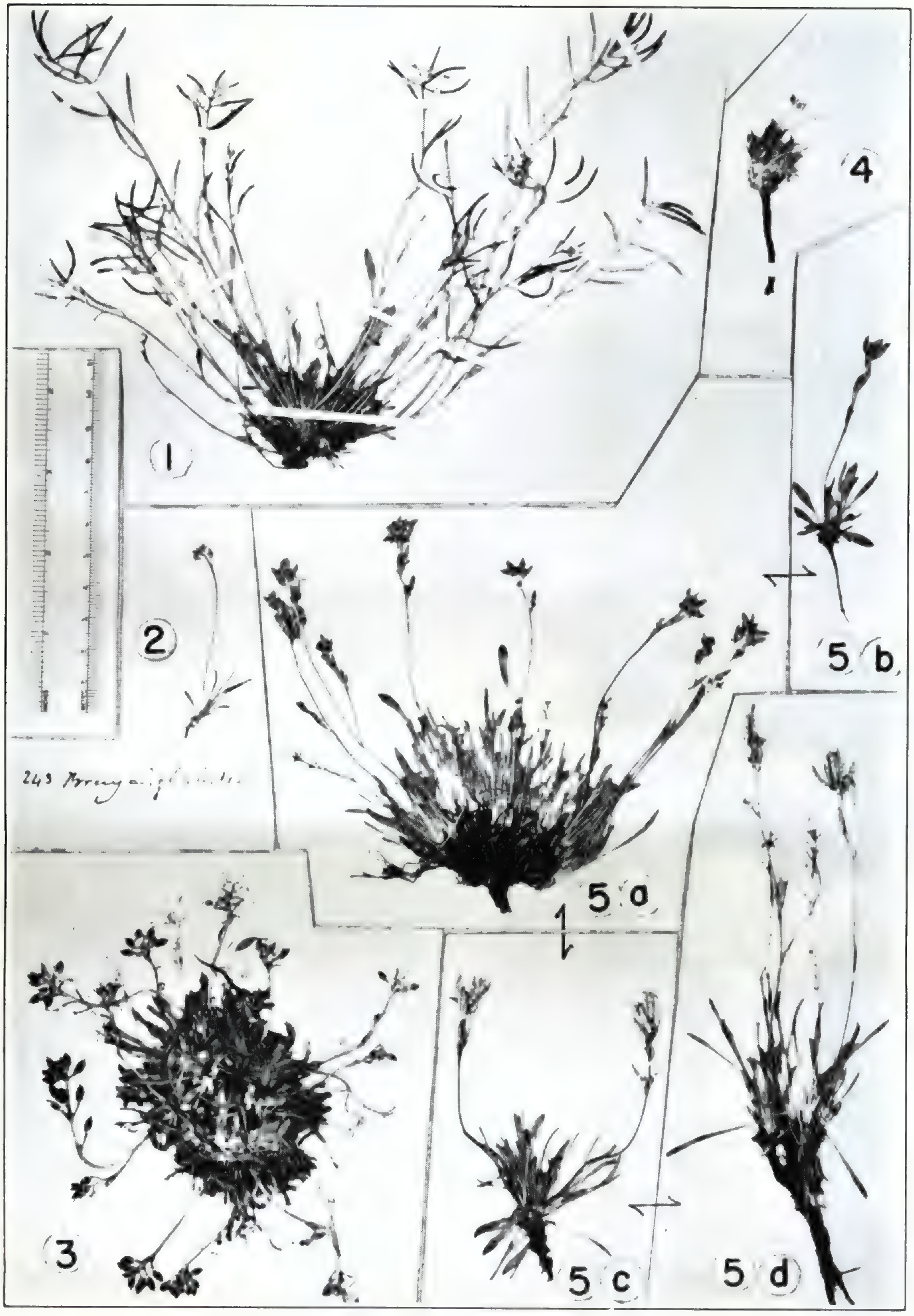
But in 1924 the German investigator Schulz, who has treated *Braya* for "Das Pflanzenreich", maintained that he could show that the name *B. linearis* must be retained because the Scandinavian species is clearly different from *B. glabella* Richards.; the latter, according to Schulz, is more robust and has much wider fruits. According to Schulz typical *B. linearis* occurs in addition to Norway only in Sweden and east Greenland.

In east Greenland the problem is complicated by the fact that the plant occurs with *B. humilis* (C. A. Mey.) Robins. According to younger Danish botanists (cf. the works of Seidenfaden, Sørensen and Gelting), who operate with the name *B. glabella* Richards., it forms a mixed popula-

[5] Oblast. Jakutsk: ad flumen Lena, Kumach-Sur, 31/7, 1898, *H. Nilsson-Ehle* s. n. (G, B), from Siberia, determined in the N. Y. Bot. Gard. material as *Braya alpina* Sternb. et Hoppe and as *B. linearis* Rouy in the Gray Herb. This material clearly is closely related to *B. linearis*, but occasionally has tufts of leaves in the axils of the lower leaves. This Siberian relative of *B. linearis* needs further study which may throw some light on Alaskan species.

[6] O. E. Schulz, Das Pflanzenreich, IV. 105, Cruciferae-Sisymbrieae, p. 230 (1924).

[7] R. Nordhagen, Om *Arenaria humifusa* Wg. og dens betydning for utforskningen av Skandinavias eldste floraelement. Bergens Mus. Årbok **1935,** Naturvidsk. rekke Nr. 1, pp. 52, 53 (1935).



BRAYA HUMILIS, × ⅖, FIG. 1
B. GLABELLA, × ⅖, FIG. 2
B. purpurascens, × ⅖, FIGS. 3–5d

tion together with *B. humilis*, certainly of hybrid origin ("*Braya glabella-humilis*"). . . .

Another noteworthy report by Sørensen (p. 39) is that *Braya purpurascens* hybridizes with the complex "Braya glabella-humilis". Hybrids are reported in this case to be sterile or weakly fruitful. In Gelting (1934, p. 57) one finds the following remarkable passage: " . . . judging from the Greenland material, *B. glabella* should be considered a variety of that species (*Braya purpurascens*)."

In Norway in the meantime *B. purpurascens* and *B. linearis* are completely different. I place myself sceptically against the assertion that *B. purpurascens*, *B. glabella* (= *B. linearis* with Schulz) and *Torularia* [*Braya*] *humilis* form a single series of forms in Greenland without distinct limits. It occurs to me that the chapter *Braya-Torularia* in Greenland is very obscure.

All that can be said with certainty is the following:

1. In Norway two distinct species of *Braya* occur, namely *B. purpurascens* (Magerøya) and *B. linearis* Rouy, which also occurs in northern Sweden (see fig. 22).
2. Neither of these is identical with *B. alpina* of the east Alps.
3. The probabilities are that "*B. glabella* Richards." is not identical with the Scandinavian species *B. linearis* Rouy.
4. According to Schulz, *B. linearis* also occurs in East Greenland. In the meantime this question cannot be answered until the entire Greenland *Braya-Torularia* material is subjected to a critical and satisfying investigation.

In the following I designate the Scandinavian bicentric *Braya* as *B. linearis* Rouy, and since this according to Schulz also occurs in East Greenland, we are obviously faced with a west-arctic amphi-Atlantic species. . . . . ".

Nordhagen's viewpoint concerning *B. linearis* is not generally accepted[8] but is, in the opinion of the writer, the most tenable until the identity of *B. glabella* is clearly established through a careful study of the type.

B. glabella Richardson, Bot. App., Franklin's Narr. Jour. Arctic Sea, ed. 1, p. 743 (1823); ibid., ed. 2, p. 753 (1823); W. J. Hooker, Flor. Bor. Am. **1:** 65 (1830). *B. alpina* of Scandinavian and other authors, not Sternberg and Hoppe. *B. linearis* of Scandinavian and other authors, not Rouy.—243 Braya ? glabella [in Richardson's hand] Richardson's Arctic Plants [in an unidentified hand] (G). PLATE 1089, FIG. 2. The type locality is given by Richardson (loc. cit.) as "On the Copper Mountains".

This is the only authentic specimen which the writer has seen. It is probably an isotype since the number corresponds to the numbering of the species in ed. 1 of Franklin's Narrative and the number and name are written in Richardson's hand.

[8] cf., for example, T. W. Böcher, Biological distributional types in the flora of Greenland. Medd. Grønl. **106**; No. 2, p. 101 (1938).

The specimen is a rather starved, flowering individual, having five flowers which terminate a rather slender bractless scape. The nearly glabrous, basal leaves are linear, one of them with a single tooth half-way to the apex. The scape is puberulent with appressed, bifurcate hairs and occasional short, simple hairs. The sepals of the flowers are oblong-ovate, ca. 2.2 x 1.0 mm., glabrous or with an occasional simple hair, green with a translucent margin. The petals (dried) are creamy-white and tinged with purple at the base, the narrow obtuse limb tapering gradually into the claw, the dimensions ca. 1 x 3 mm. The plant is not in fruit. The ovary in the older flowers is elliptic-oblong, its surface very sparsely supplied with appressed bifurcate hairs. The style is distinct and from 0.5–0.7 mm. long, and barely capitate at this stage of development. Richardson had sufficient material before him to supply the following information concerning fruiting material " . . . racemo fructifero elongato", and "siliquae immaturae suberectae calyce persistente triplo longiores, toruiosae [sic], stylo coronatae".

W. J. Hooker, with the opportunity to study Richardson's material from both the first and second Franklin Expeditions, characterizes (loc. cit.) *B. glabella* as follows "foliis glabris [although Richardson (loc. cit.) says "glabriuscula"], scapo plerumque folioso, racemis fructiferis laxis elongatis". Hooker goes on to comment "Excellent specimens of this, brought home by Dr. Richardson from the Second Arctic Land Expedition, quite confirm the distinguishing characters given by that gentleman in his Botanical Appendix. He adds, in the margin of his own copy, from notes taken on the spot, that the 'scape is sometimes hairy, with bifurcated pubescence, and that the flowers are white, with a slight and partial tinge of purple'." Furthermore Hooker without hesitation keeps *B. glabella* in the genus *Braya* which he describes in part (loc. cit.) as having "Siliqua brevis, teres, torulosa stylo terminata, valvis subsemicylindraceis."

Undoubtedly this species, as the first described *Braya* from the North American continent, is greatly in need of clarification. Its description in the first edition of Franklin's *Journal* obviously antedates R. Brown's *Chloris Melvilliana* of the same year (1823) because Brown refers to Richardson's published record of the same year. In the opinion of the writer *B. glabella* falls in the

B. purpurascens complex more nearly than it does in the *B. linearis* group. Furthermore no material seen by the writer from the western Arctic resembles *B. linearis*, so that it seems unlikely that *B. glabella* will fall into that category. Also Richardson characterizes it in his original description (loc. cit.) as having "Racemis elongatis . . . ", a character which certainly does not by any stretch of the imagination fit the inflorescence of *B. linearis* which is condensed even in fruit.

There is no evidence against *Braya glabella* of Richardson being conspecific with *B. purpurascens* (R. Brown) Bunge. The chief difficulty is the lack of positive evidence concerning the nature of the mature siliques and of their arrangement on the scape. Should these support the possibility that the two are conspecific, then the name *B. glabella* would have to be substituted for *B. purpurascens*.

3. B. PURPURASCENS (R. Brown) Bunge in Ledeb. Flor. Ross. **1:** 195 (1841). *Platypetalum purpurascens* R. Br., Chloris Melvill. [192] & [254] (1823); App. XI in Parry's Voy. p. cclxvii & cccviii (1824). *B. glabella* of authors, perhaps of Richardson. *B. Thorild-Wulffii* Ostenfeld in Medd. Grønl. **54:** 176 (1923). *B. purpurascens* var. *dubia* Schulz, Pflzrch. IV. 105: pp. 235, 364 (1924); perhaps not *Platypetalum dubium* R. Br.—EAST GREENLAND: Lille Suends, ca. 76° 45′ N., 24 Jun. 1908, *A. Lundager* 1062 (O, det. as *Braya Thorild-Wulffii* Ostf. by Ostenfeld in 1924); same locality, 22 June 1908, *Lundager* 1056 (N, det. as *B. Thorild-Wulffii* Ostf. by Ostenfeld, Sept. '24); dry "Fjaeldmark", south coast of Hochstetter Foreland, 75° 08′ N, 24/6, 1930, *R. Bøgvad* 1080 (B); sand, northwest coast of Clavering Island, 74° 25′ N, 24/7, 1929, *G. Seidenfaden* 82 (B, N); dry "Fjaeldmark", Gästis Valley, Musk-ox Fjord, 73° 34′ N, 14/8, 1930, *Seidenfaden* 1009 (N, B); sandy soil, Cape Elizabeth, Ella Island, 72° 54′ N, 17/8, 1930, *Seidenfaden* 1030 (B, O).—WEST GREENLAND: clayey, gravelly soil in shallow depression in rock, back of the Station, region of North Star Bay, 76° 30′ N, June 21, 1914, *W. E. Ekblaw* 407 (G, N); common, from patch just east, back of trading station, region of North Star Bay, 76° 30′ N, July 18, 1914, *Ekblaw* 408 (G); Ingnerit Fjord, Magdlâq, 71° 7′ N, 12–13 Jul. 1929, *M. P. & R. T. Porsild s. n.* (N, G, O); Qáersuarssuk, 70° 44′ N, 26/7. 1927, *M. P. Porsild s. n.* (N, O); Nûgssuaq Halvø, Kugssinerssuaq, 70° 18′ N, 4 Jul. 1929, *M. P. & R. T. Porsild s. n.* (N, G, O). ELLESMERE ISLAND: Grant Land, 82° 27′ N, July 1906, *L. J. Wolf s. n.* (B); muddy flat, Bache Peninsula, 79° 4′ N, 76° 18′ W, July 31, 1927, *M. O. Malte* 118 896 (O); in locis

argillaceis, ad Barren Vallies, sinus Harbour Fjord, 76° 37′ N, 84° 25′ W, 28. vii. 1900, *H. G. Simmons* 2388 (G, B); muddy flat, Craig Harbor, 76° 12′ N, 81° 20′ W, *M. O. Malte* 118 933 (O). NORTH DEVON ISLAND: muddy flat, Dundas Harbour, 74° 33′ N, 82° 12′ W, Aug. 3, 1927, *M. O. Malte* 118930 (O, G); same locality, July 27–28, 1927, *M. O. Malte* 118884 (O); Dundas Harbour, Sept. 7, 1936, *N. Polunin* 779 (O); same data, *Polunin* 2510 (G); same data, *Polunin* 2515 (O). BAFFIN ISLAND: Lake Harbour, 62° 94′ N, 69° 55′ W, Aug. 2, 1928, *M. O. Malte* 120294 (O, G); same locality, Aug. 30–31, 1934, *N. Polunin* 1121 (O); same locality, Aug. 27, 1936, *Polunin* 2327 (G); same locality, July 23, 1939, *M. E. Oldenburg* 124 (M); Arctic Bay, Sept. 8–11, 1936, *Polunin* 2524 (O). SOUTHAMPTON ISLAND: Southampton, 64° 15′ N,8 2° 50′ W, Aug. 15, 1928, *M. O. Malte* 120677 (G, O); H. B. Co. Post, South Bay, Aug. 22, 1936, *Polunin* 2275 in part (G). COATS ISLAND: wet clay amongst limestone gravel, 62° 49′ N, 81° 50′ W, Sept. 19, 1930, *A. E. Porsild* 5904 (O). NOTTINGHAM ISLAND (Hudson Strait): crevices of rocks, Aug. 26, 1884, *R. Bell s. n.* (N, G, and, O as 471.192.2176). LABRADOR PENINSULA: Rama, Jul. 15–Aug. 20, 1894, *A. Stecker* 60 (B, N, G); dunes of coarse sand above beach, Joksut Inlet, Clark Harbor, 62° 12′ N, 64° 23′ W, July 20 & 21, 1937, *V. C. Wynne-Edwards* 7172 (O); Wakeham Bay, 61° 40′ N, 72° 5′ W, July 30, 1928, *M. O. Malte* 120191 (G, O); moist limestone ledges, south side of Gulf Hazard, Richmond Gulf, 56° 10′ N, 76° 45′ W, Aug. 12, 1939, *E. C. & L. B. Abbe* 3819 (M).

In working over the material cited above, the writer at first attempted to segregate as "typical" those specimens which most closely accorded with Robert Brown's descriptions and Hooker's figures. Robert Brown originally described *Platypetalum purpurascens* on the basis of material brought back from the first Parry Expedition (loc. cit. p. 192) and extended his concept of this species when the Ross material collected on the second Parry Expedition became available while he was completing the "Chloris Melvilliana" (loc. cit., p. 254). The original description refers to the siliques as "ovales" and "glabriusculae," while the extension of his concept describes them as "v. ovali-oblongae, glabrae v. pilis raris brevibus simplicibus bifidisque conspersae". W. J. Hooker's familiar figures (loc. cit., vol. 2, tab. xxiii) illustrate both phases very well. Much of the material collected in the lower Arctic is readily referred to this typical state of the species (for instance Ekblaw's no. 408, North Star Bay, Greenland; cf. Plate 1089, fig. 3), as has been pointed out by Polunin[9],

[9] N. Polunin, Botany of the Canadian Eastern Arctic Pt. 1, Pteridophyta and Spermatophyta. Nat. Mus. Canada, Bull. no. 92. 1940. p. 249.

but gradually gives way to a depauperate state to the north or in more exposed areas. In its extreme form this depauperate phase has been described by Osentfeld as *B. Thorild-Wulffii* and is considered by Seidenfaden and Sørensen[10], who have studied it in the field, as "a particularly well-founded species." The writer, however, sees no support for this view, considering the extreme plasticity of this species and of its relatives. Thus it was found unrealistic to segregate the most depauperate phase of this species from the "typical" material.

At the other extreme is the very robust series of plants from Southampton Island (Plate 1090, fig. 1) with elongate, oblong siliques, to which Polunin has referred (loc. cit.). These are indeed strikingly unlike the great majority of specimens, but even judging by the limited number of plants which are to be found on any one sheet, they are occasionally associated with less extreme individuals. That this is indeed the case is illustrated by a suite of some 58 plants collected at an isolated station of limited extent at Richmond Gulf, P. Q., by Mrs. Abbe and the writer (no. 3819). There is complete intergradation of the characters studied[11] in this population from a lower limit which falls well within the "typical" material originally described by R. Brown and illustrated by Hooker (represented in our illustrations by fig. 3, Pl. 1089) into the robust type of specimen from Southampton Island to which Polunin has already called attention. Some of the variations in the Richmond Gulf population are illus-

[10] G. Seidenfaden and T. Sørensen. The Vascular Plants of Northeast Greenland from 74° 30′ to 79° 00′ N. Lat. Medd. Grønl. **101**; 36 (1937).

[11] It may not be amiss to give a description of this population because of its rather peculiar interest. Scapes range from 2.5 to 15 cm. in length and from slender to coarse; they are pubescent with either curly simple hairs or with bifurcate appressed hairs, or a mixture of the two. The form of rosette leaves ranges from strictly linear to narrowly oblanceolate or narrowly long-spatulate. Rarely a leaf may have a single tooth on the margin. The leaves may or may not be furnished with widely spaced simple hairs on the margins, and may or may not have tufts of simple hairs at their apices. The siliques may be crowded closely together on the fruiting scapes, or the lowermost siliques may be separated from the rest, or the siliques may be scattered generally along the length of the scape. The lowermost flower or silique may be in the axil of a foliose bract or not. The long-persistent sepals are oblong-obovate, ca. 2.5 x 1.2 mm., green or purple-green, with or without simple pubescence near the apex. Petals (dry) are creamy-white to tinged with purple, the obtuse to subretuse limb tapering gradually into the claw. Petals vary in length from 3 to 4 mm. and in width from 1 to 1.5 mm. The siliques vary in shape from rather short-elliptic (ca. 1.5 x 5 mm.) to long oblong-elliptic (ca. 2 x 12 mm.), tending to be somewhat torulose. The valves of the siliques are rather densely pubescent, being covered with either crisp simple hairs, or appressed bifurcate hairs. The style is distinct (from 0.3 to 1.0 mm. long), usually with an evident depressed capitate stigma.

trated in Plate 1089: Fig. 5a represents the phase with narrow leaves and oval silique; fig. 5b, the plant with the broader rosette leaf but the oval silique; fig. 5c, the broader leaf and elongate, oblong silique; and finally fig. 5d, the narrow-leaved plant with the long oblong silique.

In view of the variation which occurs within the Richmond Gulf population with reference to often-used characteristics, such as pubescence, it has not been thought advisable to recognize any of the variants which Schulz[12] and others have accepted. These include var. *dubia* (R. Br.) Schulz which is based on length of the style, f. *leiocarpa* Schulz and a densely pilose form erroneously referred to f. *pilosa* (Hook.) Schulz[13], based on pubescence. An inadvertent transfer, f. *longisiliquosa* (Trautv.) Schulz, in synon.[14], which Trautvetter characterized in part as "siliquis latitudine sua fere quadruplo longioribus . . . ", and which has been adopted by some writers, cannot be accepted in the light of the dimensions of the Richmond Gulf material.

In conclusion, then, the writer recognizes no valid dividing lines in the material of *B. purpurascens* which he has seen and therefore can only propose that the name be used in the broad sense without qualification.

4. B. LONGII Fernald, RHODORA **28:** 202 (1926). NEWFOUNDLAND, STRAITS OF BELLE ISLE: turfy or peaty pockets in limestone ledges, Sandy (or Poverty) Cove, Aug. 1, 1924, *M. L. Fernald, B. Long & B. H. Dunbar* 26,723 (G); among loose rocks, limestone barrens, Sandy (or Poverty) Cove, Jul. 12, 1925, *Fernald & L. Griscom* 28,423 (G, C); dry, gravelly limestone barrens, Savage Point, Jul. 13, 1925, *Fernald, K. M. Wiegand, et al.* 28,425 (G, B, O, C); gravelly and peaty limestone barrens, Sandy (or Poverty) Cove, Jul. 25, 1925, *Fernald, Long & F. A. Gilbert, Jr.* 28,424 (G, TYPE, B, C); crevices of dry limestone barrens, Yankee Point, Aug. 16, 1925, *Fernald, Wiegand & Long* 28,427 (G, C); dry gravelly and turfy limestone barrens, Savage Point, *Fernald & Long* 28,426 (G, C, B, O).

5. B. **Fernaldii,** sp. nov. Foliis rosulatis lineari-oblanceolatis 10–25 mm. longis, 0.5–2 mm. latis; racemo fructifero subcapitato-

[12] O. E. Schulz. Pflanzenreich IV. 105 (1924), pp. 234 & 235.

[13] A reduction by Schulz of Hooker's *Braya pilosa* but, judging from authentic material in the Gray Herbarium, at the National Museum of Canada, and at the N. Y. Botanical Garden, *B. pilosa* Hooker is wholly distinct from *B. purpurascens* so that Schulz's transfer must be considered as a lamentable error.

[14] This is simply given as "f. *longisiliquosa* Trautv." by Schulz, but it was described by Trautvetter as a variety.

elongato; pedicellis 1.5–3.0 mm. longis; petalis 3–4.2 mm. longis, 1–1.6 mm. latis, spathulato-oblanceolatis, roseis; antheris 0.4–0.5 mm. longis; siliquis lanceolato-subulatis 5–7 mm. longis, 1.4–1.6 mm. latis, stylo 0.4–0.6 mm. longis, seminibus subbiseriatis vel uniseriatis; seminibus 1.2 mm. longis, 0.6 mm. latis —NEWFOUNDLAND. TYPE in Herb. Gray (*Wiegand, Griscom & Hotchkiss* 28,434). PLATE 1090, FIG. 2.—*B. americana* (Hook.) Fern., as applied by Fernald, RHODORA **28:** 203 (1926), exclusive of the plant of Alberta, not *B. alpina*, β. *americana* Hook., Flor. Bor.-Am. **1:** 65 (1830).—NEWFOUNDLAND: gravelly limestone barrens one mile back of Savage Cove, Straits of Belle Isle, Jul. 24, 1925, *M. L. Fernald & B. Long* 28428 (G, C, O, B); open spots in limestone barrens near Ice Point, St. Barbe Bay, Jul. 14, 1925, *K. M. Wiegand, F. A. Gilbert, Jr. & N. Hotchkiss* 28429 (G, C); moist gravel of limestone barrens on the Highlands northeast of Big Brook, Straits of Belle Isle, Jul. 15, 1925, *A. S. Pease & L. Griscom* 28430 (G); gravelly and peaty limestone barrens back of Big Brook, Straits of Belle Isle, Jul. 15, 1925, *Fernald & Long* 28431 (G, C); clayey spots in dry limestone barrens, northern half of Burnt Cape, Pistolet Bay, Jul. 17, 1925, *Fernald, Wiegand, et al.* 28432 (G, C); boggy depressions in limestone barrens, Cape Norman, Pistolet Bay, Jul. 18, 1925, *Wiegand, Griscom & Hotchkiss* 28434 (G, TYPE, C); dry rocky and gravelly limestone barrens, Cape Norman, Pistolet Bay, Jul. 18, 1925, *Wiegand, Griscom & Hotchkiss* 28433 (G, C); sandy and clayey spots in limestone gravel barrens, Boat Harbor, Str. of Belle Isle, Jul. 19, 1925, *Fernald, Wiegand & Long* 28435 (G, C); swale near mouth of brook, Watts Bight, Straits of Belle Isle, Jul. 19, 1925, *Pease, Griscom, et al.* 28436 (G, C); gravelly limestone barrens, Four-Mile Cove, Straits of Belle Isle, Jul. 20, 1925, *Fernald, Wiegand & Long* 28437 (G); damp clay pockets in limestone rock-barrens one mile back of Savage Cove, Straits of Belle Isle, Jul. 23, 1925, *Fernald, Pease & Long* 28438 (G); dry gravel of limestone barrens, southern half of Burnt Cape, Pistolet Bay, Aug. 5, 1925, *Fernald & Long* 28439 (G); dry gravel of limestone barrens, Cape Norman, Pistolet Bay, Aug. 13, 1925, *Wiegand & Long* 28440 (G, C).

In 1926 Professor Fernald described *B. Longii* (vid. sup.) naming it for his good friend and long-time field-companion, Bayard Long. He also reported a similar but distinct species which he considered to be identical with Hooker's *B. alpina*, β. *americana*. This name he raised to specific rank so that it thereby became *B. americana* (Hook.) Fern.

After a survey of a considerable array of North American *Braya* it is clear to the writer that these two Newfoundland species

with their lance-subulate siliques are distinctly unlike those collected from elsewhere on the continent. Any close relationship to Hooker's plants collected by Drummond "among the Rocky Mountains, between lat. 52° and 57°" seems unlikely. Even if, as Professor Fernald has suggested (loc. cit.), Stewardson Brown's no. 1457 of the Rocky Mountains should turn out to be conspecific with Drummond's material, it is certainly not conspecific with the plant of Newfoundland which has passed as *B. americana* (Hook.) Fern. Stewardson Brown's no. 1457, as contrasted with *B. Fernaldii*, has half-mature fruits which are narrowly ovate-elliptic rather than lance-subulate, the petals are wider and have purplish claws rather than being uniformly "pinkish" (Fernald, loc. cit.), the anthers are shorter and relatively broader, and the arms of the bifurcate hairs are longer than in the Newfoundland material.

B. Fernaldii and *B. Longii* share a combination of characters,—siliques lance-subulate, not torulose, 4–6 mm. long, the few seeds crowded usually into a single row—which sets them sharply off from all other North American species of *Braya*. However, the markedly larger petals (4–5 mm. long) with white limb and blue-violet claw, and the glabrous siliques of *B. Longii* distinguish it from *B. Fernaldii* with its smaller (3–4 mm. long) uniformly pinkish (to white) petals, and hirtellous siliques.

Because the name *B. americana* (Hook.) Fern. appears to be inapplicable, and because there is no other name available for this Newfoundland endemic, the writer considers it a privilege to name it for Professor M. L. Fernald, who critically described it. It is fitting, too, that his name and that of Bayard Long, should be linked in the names of these twin-species from the Newfoundland flora to the knowledge of which they together have added so much.

EXPLANATION OF PLATES 1088–1090

PLATE 1088. BRAYA HUMILIS (Mey.) Robins., habit-photographs of geographical races (see also Plate 1089, fig. 1), all × ⅖. FIG. 1, Race 5, Willoughby Cliffs, Vt., June 22, 1884, *C. E. Faxon* (G); FIG. 2, Race 6, Severn River, Hudson Bay, *J. M. Macoun*, no. 2087 (O); FIG. 3, Race 2, Itivdleq-Fjord, Qingua, Groenl. Occid., July 6, 1926, *M. P. Porsild* (G); FIG. 4, Race 3, Rivière Jupiter, Anticosti Island, *Marie-Victorin & Rolland-Germain*, no. 24,849 (O); FIG. 5, Race 4, Table Mountain, region of Port à Port Bay, Newfoundland, *Fernald & St. John*, no. 10,837 (G).

PLATE 1089. BRAYA HUMILIS (Mey.) Robins., habit-photographs of geographical races, ctd. (see also Plate 1088, figs. 1–5), × ⅖. FIG. 1, Race 1, Kempe Fjord, East Greenland, *Seidenfaden* 462 (B).

BRAYA PURPURASCENS, × ⅗, FIG. 1
B. FERNALDII, TYPE, × ⅖, FIG. 2

BRAYA GLABELLA Richards. FIG. 2, 243 "Richardson's Arctic Plants" (G), × ⅖.

BRAYA PURPURASCENS (R. Br.) Bunge, habit-photographs illustrating range of variation (see also Plate 1090, fig. 1), all × ⅖. FIG. 3, "typical" phase, region of North Star Bay, N. W. Greenland, *W. E. Ekblaw*, no. 408 (G); FIG. 4, depauperate phase, Lille Suends, c. 76° 45′ N., Greenland, *Lundager*, no. 1062 (O); FIGS. 5a–5d, "typical" to robust phase, Richmond Gulf, P. Q., *Abbe & Abbe*, 3819 (M): FIG. 5a, short, elliptical silique and narrow rosette leaves; FIG. 5b, short, elliptical silique and broader rosette leaves; FIG. 5c, long, oblong silique and broader rosette leaves; FIG. 5d, long, oblong silique, and narrow rosette leaves.

PLATE 1090. BRAYA PURPURASCENS, habit-photographs illustrating range of variation (see also, Plate 1089, figs. 3–5b), × ⅖. FIG. 1, robust phase, Southampton, Southampton Island, *M. O. Malte* 120,677 (O).

BRAYA FERNALDII Abbe. FIG. 2, TYPE, × ⅖, Cape Norman, northwestern Newfoundland, *Wiegand, Griscom & Hotchkiss*, no. 28,434 (G).

UNIVERSITY OF MINNESOTA,
MINNEAPOLIS, MINN.

ANOTHER AGGRESSIVE HAWKWEED.—Mr. Henry S. Dennison recently sent to the Gray Herbarium material of a weed which interested him, found in the confines of a 500-foot carry between Sysladobsis and Pocumpsus Lakes in the center of Washington County (nearest Springfield post-office), Maine. The plant proves to be a variety of the already too aggressive *Hieracium Pilosella* L., this one being var. *niveum* Muell.-Arg., with the lower leaf-surface permanently white. It is likely to become another pest.—M. L. FERNALD.

THE NEW WASHINGTON-BALTIMORE CHECKLIST.—The second edition, dated December, 1946, of the Washington-Baltimore Checklist by Frederick J. Hermann[1] has come to hand. The new list replaces that of 1941 and largely epitomizes changes in the identifications of the vascular plants of the region west of Chesapeake Bay, north to the Pennsylvania stateline, south to the Rappahannock and Rapidan Rivers and westward to the eastern bases of the Blue Ridge. At the west the Bull Run Mountains are included. Under each group waifs are separated from the native and truly naturalized species, a praiseworthy distinction in view of the mapping in a much used handbook of species for states where they are not established, simply because someone fifty or seventy-five years ago found casual waifs on ship's ballast or on waste from woolen-mills of New England, species foreign to the area but which got entangled in the wool which eventually landed at North Berwick, Chelmsford or other woolen-mill centers but which have not persisted in New England; unless one knows the facts he would infer from such maps that these mere waifs are really a part of the established flora. Congratulations to the authors of the Checklist for clearly differentiating them!

[1] A CHECKLIST OF PLANTS IN THE WASHINGTON-BALTIMORE AREA by *Frederick J. Hermann*, member of Executive Committee, Conference on District Flora. Second Edition, December, 1946. Issued by the Conference on District Flora, *E. H. Walker*, Chairman.

The treatments of some groups have been prepared by special contributors: the *Pteridophyta* by Mr. W. H. Wagner, Jr.; *Gramineae* by Mrs. Agnes Chase; *Cyperus* by Dr. Hugh O'Neill; *Rubiaceae* by Dr. F. R. Fosberg. The three latter treatments follow the well known philosophy of the three authors, interpretations with which some others may differ. The treatment of most groups, however, will be generally accepted, these being quite tolerant of recent changes which are necessary where types or differential characters have been restudied and demonstrated to have been misunderstood.

In some cases, however, restudy may bring some important changes. In the *Pteridophyta*, for instance, although the treatment is largely a safe one to follow, it sometimes seems based on limited experience. *Dryopteris intermedia* is maintained as a species distinct from *D. spinulosa* but *Polypodium virginianum* is remerged with the European and western North American *P. vulgare*. There are of course those who argue for the specific separation of the two members of *Dryopteris*, which can be separated by a slight difference in the cutting of the frond and by the presence or absence of glands on frond and indusia, but in much of their American ranges they are coincident and those with large field-experience find them too often intergrading. Such sound students as Hooker, Gray (in his mature years), D. C. Eaton, Underwood, Davenport, Christensen, Weatherby, Tryon and many more have treated them as variations of a single species. *Polypodium virginianum*, on the other hand, has a very different geographic range from *P. vulgare* and the two differ in many definite morphological characters which are summarized in RHODORA, XXIV. 136 (1922). Besides these another significant character has been pointed out by Dr. P. Martens in his detailed study, *Les Organes glanduleux de Polypodium virginianum* in Bull. Jard. Bot. de l'État Brux. xvii. 1–14 (1943). In *P. virginianum* the sporangia are mixed with long-stalked clavate simple or branched glands; in *P. vulgare* such structures do not occur. Since the revival in 1922 of *P. virginianum* it has been generally recognized as a distinct species; but, if this is not a species, what possible defense can be made for the specific recognition of *Dryopteris intermedia*?

In the treatment of *Gramineae*, furthermore, it is a striking fact that many correction and studies made outside of Washington are ignored. In the pages of RHODORA many former treatments have been clearly demonstrated to need alteration, but in the Checklist several of the corrected names are either completely ignored or too hastily reduced to synonymy of quite different species. If Washington botanists persist in writing *Erianthus* "giganteus (Walt.) Muhl." (for discussion see RHODORA, xlv. 249–252 (1943)), if they continue to confuse our slender and chiefly annual *Paspalum fluitans* (Ell.) Kunth with the coarse and stoutly perennial tropical *P. repens* Bergius (see RHODORA, xxxix. 382–388, plate 474 (1937)), if they believe that real *Muhlenbergia mexicana* (see RHODORA, xlv. 224–230, plates 749–752 (1943)) grows about Washington, they will be perpetuating error. These are not merely matters of personal opinion or judgment but simple and demonstrated facts. In RHODORA, l. c. (1943) it was clearly shown that failure to check the original Latin descriptions and to study carefully the types had resulted in an unusual amount of error in the then current treatment of our eastern species of *Muhlenbergia*. But in the new Checklist the old error regarding *M. mexicana* is perpetuated. Other similar cases, such as *Cenchrus pauciflorus* of Mexico and adjacent Texas (see RHODORA, l. c. 387, 388 (1943)) need not here be piled up; they will be apparent to those who have kept abreast of recent careful revisions. It is not necessary to continue past errors in such cases.

In perusing the pages of this mostly creditable Checklist one is gratified to find that the records have usually been carefully checked. Only in a few cases are omissions apparent to one whose limited time for field-work farther south and demands of the classroom farther north have always forced him to pass, without time for visits, as rapidly as possible through Washington and Baltimore. In 1904 Mrs. Chase wrote to the Gray Herbarium and sent many

specimens, collected from April through October, of the well marked and in Europe generally recognized *Capsella rubella* Reuter, these collections all made in Washington. The species is a very definite one, distinguished from the ubiquitous *C. Bursa-pastoris* (which is a greenish plant with petals much exceeding sepals, the silicles with straight or slightly convex margins, the summit subtruncate to barely emarginate) by its reddish or purplish tone, very small petals, the silicles small and with margins concave above, the summit definitely emarginate. It is too bad that Mrs. Chase's discriminating observations got overlooked. The species is an abundant weed northward and it abounds in southeastern Virginia; it is not a mere waif.

In the Gray Herbarium two other additions to the Checklist are represented. *Carex texensis* (Torr.) Bailey is there represented by material collected by *C. F. Wheeler*, June, 1907, and marked "Smithsonian grounds, in lawn. Adv.?". This sheet was identified by Mackenzie but he did not enter the District of Columbia for it in the North American Flora. Evidently indigenous material comes from farther east: sandy woods, Centerville, Maryland, May 22, 1930, *H. D. House*, no. 7306. *Linum intercursum* Bickn. is represented by *S. F. Blake*, no. 9564 from dry bank, Hyattsville, Maryland (identified as *L. floridanum*).

In a few cases, besides those already mentioned, the authors would do well to check or clarify some of the names used, as well as their cited authors. Thus we here find "Selaginella apoda (L.) Spring ex Mart. (S. apus (L.) Spring)". Turning to Martius, Flora Basiliensis, i². 119 (1840) we find Spring making the new name *S. apus* and citing four early species of *Lycopodium* as belonging to it, these including *L. apodum* L. If the authors have a reference to Martius where the combination *Selaginella apoda* was published it would be helpful to have it cited. The latter combination is usually dated from its publication in Rhodora, xvii. 68 (1915). *Arabis dentata* (Torr.) Torr. & Gray (1838) is antedated by *A. dentata* Clairville (1811). The name of the plant of the Washington area is *A. perstellata* E. L. Braun, var. *Shortiana* Fern. in Rhodora, xlviii. 208 (1946). *Lysimachia longifolia* Pursh (1814) is taken up with *Steironema quadriflorum* (Sims) Hitchc. as a synonym. Since, however, the latter combination rests on *Lysimachia quadriflora* Sims (1803), a well described and illustrated new species without competition as to name, the conclusion is obvious. *Veronica polita* Fries should replace *V. didyma* Tenore —see Schinz und Thellung in Vierteljahrschr. nat. Ges. Zurich, li. 496 (1906) and liii. 561 (1909), also Mansfeld in Fedde, Repert. xlvii. 151 (1939).

Although the "nomenclature conforms with the International Rules," the authors almost scrupulously avoid Recommendation XLIII, that "Specific (or other) epithets should be written with a small initial letter, except those which are derived from names of persons (substantives or adjectives) or are taken from generic or vernacular names (substantives or adjectives)." The latter part of this Recommendation is not generally subscribed to in Washington. Furthermore, if an acute feeling for words, such as is required in the capitalizing of initials above referred to, had prevailed, we should not find such an impossible combination as *Nuphar* "advenum", a blunder not caught in the enumeration of 120 or more emendations and corrections at the end of the Checklist.

The present reviewer was asked to "publish some friendly comments on the Checklist". He has done so, though, along with praise of some features, he has also taken time to point the way to some needed corrections. It is hoped that, when the detailed flora of the area sometime comes out, the friendly suggestions here made will be recognized as such.—M. L. F.

A RED-FRUITED FORM OF PODOPHYLLUM PELTATUM.—There is an unnamed form of *Podophyllum peltatum* L. growing wild in Indiana, on which Mr. Charles C. DEAM (*Flora of Indiana*, p. 476, 1940) reports as follows: "In 1927, I found a specimen that had a maroon-colored fruit in a wood on the Arthur Miller farm near Mauckport, Harrison County. I did not preserve the fruit but I moved the plant to our garden where it multiplied and in 1937 I succeeded in maturing four large fruits. These I sent to Dr. Edgar Anderson, of the Missouri Botanical Garden, for study."

In 1943, Mr. Deam sent some rhizomes of this peculiar form to the Montreal Botanical Garden. They were planted in the shade-garden, next to plants of the Himalayan pink-flowered *Podophyllum Emodi* Wall. Alongside, in the same bed, grows typical eastern American *Podophyllum peltatum* L., from the region of Montreal. The characteristic yellow fruit of the latter species has merited it the colloquial name "Citronnier" which, according to Michel SARRAZIN, the French settlers gave the plant about the year 1700.

The patch of the red-fruited form increases every year. Last fall, a dozen fruits were collected and offered to botanical gardens through our *Delectus Seminum et Sporarum*. The fruit is maroon from the start, while those of typical *Podophyllum peltatum* are green and turn yellow only when fully ripened.

This variation, which may be found in the whole area of *Podophyllum peltatum*, is striking enough to deserve a name. Hence, I propose to call it:

Podophyllum peltatum L., f. **Deamii,** n. f. *A typo differt fructu fusco-rubro.*—TYPE: In cultivation at the Montreal Botanical Garden under No. 755–43, from rhizomes collected near Mauckport, Harrison County, Indiana, by C. C. DEAM.

Dried specimens of the type material are deposited in the joint herbarium of the Université de Montréal and the Montreal Botanical Garden.

The author wishes to thank his colleague James Kucyniak, for his assistance in the drafting of this note.—MARCEL RAYMOND, Montreal Botanical Garden.

NOTES ON MINNESOTA PLANT-LIFE

Olga Lakela

To the introduced flora of the state is herewith added Hieracium aurantiacum L., coll. no. 6890 *Lakela*, from a cultivated hay-field on highway No. 9 eight miles northwest of Duluth. At the time of the collection, last June 29, the colorful adventive was at the climax of its flowering, aiding in locating the established colonies along the roadside fields. At a later date a single plant was observed and collected on a sandbar-island in Duluth harbor where it had invaded a thirteen-year-old vegetation community. Evidence points to its cultivation in local flower gardens.

White-flowered *Epilobium angustifolium* L. was detected among the typical form, covering acres of partly cleared terrace of Lake Superior at the Twin Points resort, near Split Rock river, Lake Co. The coll. no. 7272 *Lakela and Ethel Sue Horton*, consisting of plants with well developed inflorescences of flowers with pure white petals and greenish sepals, were determined as *E. angustifolium* f. *albiflorum* (Dumort.) Haussk. The petals on drying turned pinkish. The form is previously unreported from the state.

The finding of *Ophioglossum vulgatum* L. var. *pseudopodum* (Blake) Farw. is of interest, because the fern is so rarely encountered within the state that it is previously known only from two localities, Washington and Pine counties on the east-central border of Minnesota, by collections dating back to 1905 and 1925, respectively. The Duluth colony was discovered during a survey of the flora on a sandbar-island in Superior, Bay, known to support a thirteen-year-old plant community. The fern is established in moss-mats sometimes under shrubs where the soil of fine sand, darkened with humus from residual decay, remains moist. The numerous roots, spreading horizontally within the top inch of the soil, develop new plants from adventitious buds. The plants usually are in clusters of two or more. Sixteen plants were counted in a single square foot of the area, associated with young sporophytes of *Onoclea sensibilis*, *Liparis Loeselii* and other perennials. Coll. nos. 7101 and 7289 *Lakela* were made at the southeast corner of the island where the colony shows best development.

The discovery of *Eleocharis nitida* Fern., coll. nos. 6887 and 7090 in a partly cleared border of an exsiccating swamp on highway 53, about one and one-half miles north of Cotton, St. Louis Co., extends the range of the species about forty miles inland from the North Shore of Lake Superior. The statement on its general distribution[1] is herewith emended to include Alaska. Through the courtesy of Professor Eric Hultén, Stockholm, the writer has at hand a specimen from Kodiak Island with the reference, Flora of Alaska and Yukon, 2. p. 293. 1942.

UNIVERSITY OF MINNESOTA,
DULUTH BRANCH.

ASPLENIUM MONTANUM IN SOUTH-CENTRAL MASSACHUSETTS.—Dr. Burton N. Gates recently brought to the Gray Herbarium for verification a small but unmistakable frond of *Asplenium montanum* collected in Sturbridge, Massachusetts, by Mrs. Edward I. Comins. Only one plant was observed, first in July, 1944, and again two years later. It grew, as individuals of this species should, in a crevice of a shaded granitic ledge.

The Sturbridge station is the first known to me from any part of Massachusetts east of the Housatonic Valley and extends the northeastern limit of the species from Scotland, Connecticut—about 30 miles. Representative fronds are preserved in the herbarium of the Hadwen Botanical Club (sheets 19,719 and 19,720) at Clark University, Worcester.—C. A. WEATHERBY, Gray Herbarium.

[1] Lakela, Olga. RHODORA **49**: 81–82. 1947.

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LESPEDEZA STRIATA AND L. STIPULACEA[1]

DUANE ISELY

(Plates 1091 and 1092)

Lespedeza is primarily a genus of perennials (herbaceous or shrubby). The lespedezas occurring in North America, however, include two annual species, *Lespedeza striata* (Thunb.) Hook. and Arn. and *L. stipulacea* Maxim. Both are introduced from eastern Asia and are widely cultivated in this country; both have escaped extensively and in the South are a conspicuous element of roadside, pasture, and wasteland flora. Of these two, *L. striata* only is treated in such manuals as have come to my attention, with the exception of Deam's Flora of Indiana where the two species are differentiated only on the basis of a pubescence character. It seems desirable to call attention to the widespread naturalized occurrence of *L. stipulacea* in certain areas of the country and to point out distinguishing characteristics between it and its better known congener. A brief review of important items in the botanical history of these two plants is also presented.

The name *Hedysarum striatum* was originally applied by Thunberg in 1784.[2] The plant concerned was doubtfully placed in the genus *Desmodium* by DeCandolle,[3] and was transferred to

[1] In the course of preparation of even a short item such as this I have become indebted to several individuals for aid in obtaining literature and for suggestions made. Sincere thanks are offered. Particular acknowledgment is due CHARLES L. GILLY, who, in addition to making numerous constructive comments, prepared the included drawings.

[2] Fl. Jap. 289. 1784.

[3] Prodromus 2, 337. 1825.

Lespedeza by Hooker and Arnott.[4] I have not seen Thunberg's material, which is presumably in Upsala, nor have I seen literature references indicating that anyone else has checked the current application of this name. The original description is somewhat ambiguous. It is, in general, referable to, if not specific for, *L. striata* as we understand it today. The leaflets, however, are described in part as follows: "Foliola oblonga, obtusa, subretusa, setula acuminata . . . glabra linea dorsali pilosa." Oblong leaflets are distinctly characteristic of *L. striata*. The subretuse tip and dorsal pilose line are, however, scarcely to be noted for this species; they are, on the contrary, markedly characteristic of *L. stipulacea* (See Plate 1092). It is possible that Thunberg's specimens consisted of a mixture. Further comment upon this problem cannot be made until type material is available.

Maximowicz's *L. stipulacea* was described in 1859.[5] The description is quite lucid, clearly referring to the plant now known under that name. Maximowicz also enumerates certain distinctions between his plant and *L. striata*. In subsequent Asiatic and European literature, however, these two species are much confounded. In some treatments they are maintained separately and in others regarded as synonyms. Maximowicz, himself, threw his plant into synonomy under *L. striata* in 1873.[6] *Kummerowia*, described by Schindler in 1912,[7] consists of a segregate genus based upon these species. Schindler distinguishes this genus from *Lespedeza* on the basis of the annual habit, leaf phyllotaxy, and certain characteristics of the inflorescence and fruit. However, while recognizing a "micro-genus" he did not distinguish between the two species; *L. stipulacea* Maxim. is listed as a synonym under *Kummerowia striata* (Thunb.) Schindl.

Relative to the application of the names in North America, Asa Gray[8] appears to be responsible for originally identifying the "Japanese Clover", introduced earlier in the 19th century, as *L. striata* (Thunb.) Hook. and Arn. Pieters and Van Eseltine[9] report as *L. stipulacea* Maxim. the "Korean lespedeza" introduced by the U. S. Department of Agriculture. They also point

[4] Bot. Beech. 262. 1841.
[5] Prim. Fl. Amur. 85. 1859.
[6] Act. Hort. Petrop. 2, 382. 1873.
[7] Fedde, Rep. 10, 403. 1912.
[8] Am. Nat. 1, 495. 1867.
[9] U. S. D. A. Dept. Circ. 317. 1924.

out certain characters useful in differentiating this species from *L. striata*. Reference is frequently made to their paper by agronomists, but it has been largely ignored by taxonomists.

The present note treats these annual lespedezas as being two superficially similar but amply distinct entities in the genus *Lespedeza*. The confusion in the literature concerning the identity of these plants and the frequent relegation of *L. stipulacea* to synonymy probably should be attributed to non-critical observation; this viewpoint will be substantiated by data given in the latter portion of the present paper. Relative to the generic position of these plants, it is granted that they should doubtless be considered a distinct section of the genus, but Schindler's generic segregation cannot be accepted.

The time and place of the introduction of *Lespedeza striata* upon the North American continent are problematic. The earliest printed reference which I have seen pertains to a collection of this plant near Monticello, Georgia, made in 1846.[10] Early records indicate that the plant was well distributed over the southeastern portion of this country by the time of the Civil War. Attention was soon drawn to its value for pasturage; hence its subsequent employment as a cultivated plant. The story of *L. stipulacea* is the converse of the above. It was brought to this country in 1919 specifically for trial as a cultivated plant and has subsequently become established as an escape from cultivation. The original introduction was by seeds sent from Korea to the U. S. Department of Agriculture in Washington.[11] It is, of course, possible that, like *L. striata*, the plant was previously present in the United States, but there appears to be no definite evidence to this effect.

The range of these two plants in this country today is essentially equivalent to the areas in which they find agricultural employment. *L. striata* is a bit the more southern of the two. It reaches central Missouri, southern Illinois, and Indiana as a northern limit and extends west into eastern Kansas and Oklahoma, south and east to the Gulf and Atlantic coasts. *L.stipulacea* is present from central Iowa eastward to Pennsylvania and south to central Alabama and Georgia. Its western limits

[10] Porter T. C., Am. Nat. 2: 39. 1868.
[11] Pieters and Van Eseltine, l. c.

are approximately the same as for *L. striata*. However, the recent introduction of varieties of *L. stipulacea*, which will set seed in Canada, suggests that it may in time become naturalized in more of our north central and northeastern states.

These two plants, particularly *L. striata*, possess tendencies characteristic of polymorphic species, displaying considerable variation in habit, leaflet shape, and pubescence; considerable physiological divergence is likewise exhibited in the varied degrees of adaptation of different varieties or strains to agronomic application in different agricultural regions. To some extent this aspect of natural variability is, perhaps, spurious, being the result of intercrossing between escapes representing various strains which have been selected out of the original population by man. It is entirely possible that the plant populations are much more uniform in their native habitats. In this country, *L. striata* is represented by three principal cultivated forms or varieties (in addition to numerous other less widespread selections). These are known as Common lespedeza,[12] Kobe lespedeza, and Tennessee 76. Kobe lespedeza possesses a certain degree of morphological differentiation relative to the other two forms, being larger, coarser, and more pubescent. The calyx-lobes are sparsely grey-pubescent in contradistinction to the glabrous or merely ciliate calyces of the Common lespedeza, and the loment and seed are markedly larger. It is neither one of, nor derived from, the *L. striata* strain or strains originally introduced into this country but has been recently (1920) brought in from Kobe, Japan. As to the possible varietal significance of Kobe lespedeza, recognition of such would scarcely seem to be justified, at least on the basis of its morphological characters alone, these being concerned primarily with size and pubescence. If, however, in its native habitat Kobe lespedeza represents a more or less definitive plant population possessing certain geographical or ecological characterizations in contrast to the other forms of this species, nomenclatural consideration as a variety might be in order. This, however, would not seem justified on the basis of its role in this country and cannot be considered in this present paper in the

[12] This plant in the past has been widely known under the appellation of "Japanese Clover" and is so designated in many of our manuals. This name has, however, been replaced almost entirely in common usage and in agronomic nomenclature by the perhaps more appropriate "Common lespedeza."

absence of data concerning its Asiatic distribution and variability.[13]

Tennessee 76 is a strain selected from parent stock of *L. striata* in this country. The plants are characteristically more erect-growing and larger than those of Common lespedeza but appear to have no definitive morphological distinctions of taxonomic significance.

L. stipulacea is known in this country under the names of Korean lespedeza and Harbin lespedeza. Korean lespedeza is represented by several selections such as Improved Early Korean and Late Korean. These forms have been synthesized from stock derived from the original introduction; none of them appear to have any distinctions of taxonomic significance. Harbin lespedeza, however, represents a separate introduction of this plant from Harbin, Manchuria. This plant is adapted to much shorter periods of vegetative growth. It is a smaller, more sparse plant than typical Korean lespedeza and may possess other characters indicative of varietal distinctness.

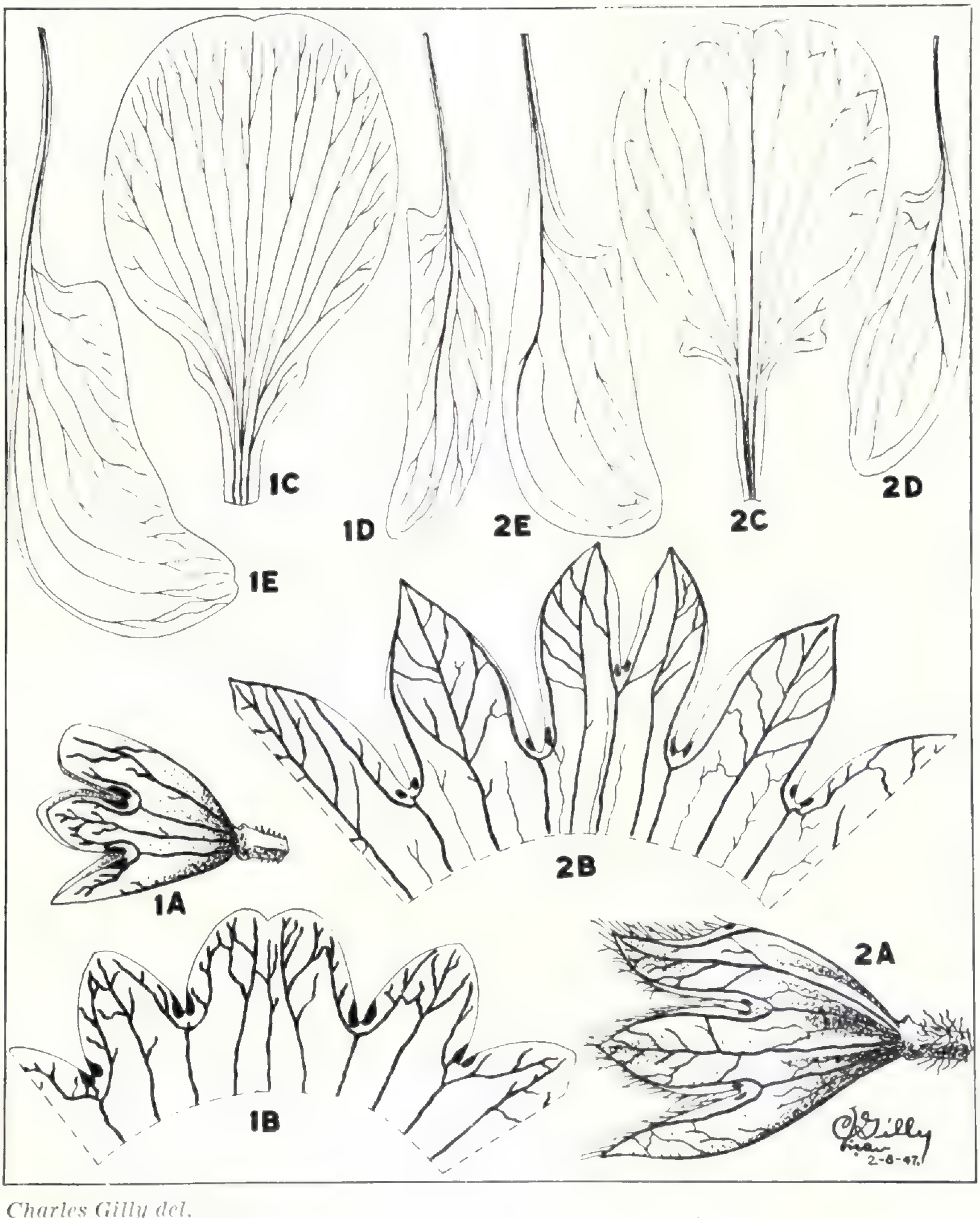
The most easily observed, but not invariably reliable, differences between the two species under discussion have to do with habit, petiole-length, and leaflet-shape, the most critical diagnostic distinctions are concerned with configuration of the calyx, loment, and seed. These and other helpful characterizations are presented in tabular form below. No attempt is made to give complete descriptions of these plants; only those characters wherein the species have been observed to differ are discussed.

[13] Relative to the much-discussed problem concerning the advisability of giving recognition in the language of scientific nomenclature to various morphologically distinct, cultivated agronomic and ornamental plants, it might be commented that the element of time as well as that of structural discontinuity should be considered. I have heard it maintained that "varieties" and "strains" of many of our cultivated plants (particularly ornamentals) possess a much greater morphological divergence than do many "natural" varieties and subspecies. This is undoubtedly true—it is likewise true that many so-called varieties and subspecies should scarcely be recognized as such. Cultivated varieties, however, are apt to be ephemeral things; they are fancied for a few years and then dropped, as something better comes along, disappearing forever in oblivion. Being almost entirely dependent upon the hands of man for the maintenance of their genetic distinctness, they are in no way comparable as a definite biological entity to a self-perpetuating varietal or subspecific population with an established (albeit probably changing) ecological or geographical range. This generalization would seem to be applicable even if the morphological characters of the "natural unit" are rather weaker than those of the man-made "toy."

PLANT-CHARACTER	L. STRIATA (Thunb.) H. & A.	L. STIPULACEA Maxim.
HABIT[14]	Prostrate or spreading, or, in close stands, ascending to erect, scarcely exceeding 20 cm. in height, diffusely branched.	Similar to *striata* but commonly taller and in dense stands, frequently scarcely branched.
STEM-PUBESCENCE	Downwardly appressed, in several lines, or covering nearly entire surface of stem.	Upwardly appressed or somewhat spreading, frequently only in one or two lines on stem angles.
LEAVES		
Petiole-length	1–2 mm., uncommonly 3–5 mm.; leaves usually appearing subsessile.	4–10 mm. on main stems but frequently shorter on ultimate branchlets; leaves mostly appearing distinctly petioled.
Leaflet-shape	Obovate to narrowly elliptic or oblong, averaging about 2 times longer than wide, usually not apically emarginate.	Spatulate to obovate, averaging about 1.4 times longer than wide, usually strongly cuneate basally, and apically emarginate.
Leaflet-pubescence	Hairs absent or inconspicuously present on leaflet margin and midrib, short (considerably less than 1 mm. long), subappressed and relatively non-evident.	Hairs very conspicuous on margins and lower midrib of young leaflets, trichomes 1 mm. or more in length, divergent or subappressed, stiff.
STIPULES	3–5 (–6) mm. long, and 1–1.8 mm. wide	Variable in size, mostly 5–8 mm. long and 3–4 mm. wide on main stems, much smaller in inflorescences, sometimes particularly conspicuous at stem tips (previous to flowering) where they sometimes develop before the leaves and overlap in imbricate fashion.
INFLORESCENCE[15]	Flowers arising from leaf axils of nearly entire plant, from main stems as well as branch apices.	Flowers arising from leaf axils of apical shoots; lower nodes frequently give rise to short flower-bearing shoots but not to axillary flowers.
FLOWER[15]		
Calyx	(2–) 2.5–3.3 mm. long; teeth appearing 5 in number, subequal, the dorsal two somewhat united and thus ap-	1.5–1.9 mm. long, teeth appearing 4 in number; 3 (anterior and laterals) similar, narrow, pointed, the

[14] P. L. Ricker (personal correspondence) comments on habit distinctions between these plants as follows: "While the stems of *striata* are often procumbent or decumbent, the tips of the branches almost always turn up and do not lie absolutely flat on the ground as do some stems of *stipulacea*."

[15] Floral distinctions, other than those mentioned here, are abundantly present. These have to do with small but none the less definitive divergences in shape of the petals and the calyx-lobes, as well as the venation of these structures. It is believed that these are more clearly represented in Mr. Gilly's illustrations than would be possible by additional discussion.



Charles Gilly del.

LESPEDEZA STIPULACEA, FIG. 1.
L. STRIATA, FIG. 2.

Photo John Staby

LESPEDEZA STIPULACEA, FIG. 1.
L. STRIATA, FIG. 2.

PLANT-CHARACTER	L. STRIATA	L. STIPULACEA
	pearing slightly shorter than others.	other two united almost to the apex, appearing as a single, broad, emarginate tooth.
Petals (non-cleistogamous flowers)	Standard approximating 4 mm. in length, appearing subequal to keel in flower; wings slightly shorter.	Standard about 5 mm. in length, but considerably bowed in flower and appearing conspicuously shorter than keel; keel approximating 6 mm. in length; wings exceeded by both standard and keel.
FRUIT (mature)[16]		
Apex	Apically acuminate to a distinct point or beak.	Apically rounded with a very short, straight or recurved point.
Surface	Weakly brownish-black-reticulate, not glandular.	Strongly reticulate with black, cord-like ridges; usually conspicuously glandular.
Adherent calyx	½–⅘ covering fruit.	⅓–½ covering fruit.
SEED (mature)	Black, mottled with lighter areas; distinctly notched or lobed in vicinity of hilum.	Solid purple-black, not mottled; margin nearly entire, scarcely lobed.

PLATE 1091

1. LESPEDEZA STIPULACEA. 2. LESPEDEZA STRIATA: *a.* calyx, lateral view, bracts removed; *b.* calyx, upper portion, split and spread open to show shape of lobes and venation (pubescence omitted); *c.* standard,; *d.* wing; *e.* one half of keel. All × 10. Drawings by CHARLES GILLY.

PLATE 1092

1. LESPEDEZA STIPULACEA (material from *Isely*, 3848, Colbert Co., Ala.). 2. LESPEDEZA STRIATA (material from *Isely*, 4420, Henry Co., Tenn., and *Justice and Isely*, 32, Montgomery Co., Ala.): *a.* habit × ½; *b.* stem-enlargement to show pubescence × 9; *c.* leaf and stipule × 1½; *d.* stem-apex, showing pubescence of young leaves × 1½; *e.* mature fruit, calyx present at left, calyx removed at right, both × 4½; *f.* mature seeds × 4½. Photographs by JOHN STABY.

BOTANY DEPARTMENT
IOWA STATE COLLEGE,
AMES, IOWA

[16] Excellent descriptions and illustrations of fruit and seed of Common, Kobe, Korean, and Sericea lespedeza are given by F. H. Hillman in a leaflet (no identification or serial number indicated) issued by the Division of Seed Investigations, U. S. Department of Agriculture, December, 1934.

NOTES ON THE COMPOSITAE OF THE NORTHEASTERN UNITED STATES

VI. CICHORIEAE, EUPATORIEAE, AND ASTEREAE

Arthur Cronquist

Aster Priceae Britton has been considered to differ from *Aster pilosus* Willd. in its pink-purple rather than white rays, slightly larger heads, and more restricted, southern distribution. The difference in head-size is not great enough to be depended upon, however, and there is some overlapping even outside the area where the two grow together. Furthermore, occasional otherwise apparently typical forms of *A. pilosus*, growing far outside the range of *A. Priceae*, have pink rays. In Athens, Georgia, I have seen both "species" growing together and apparently hybridizing freely, with many intermediate specimens forming a gradual transition from one extreme to the other. Since the general aspect of *A. Priceae* is similar to that of *A. pilosus*, since the technical differences are inconstant, and since there is field evidence of free hybridization, it seems necessary to reduce *A. Priceae* to intraspecific status.

Aster pilosus Willd. var. **Priceae** (Britton) Cronquist, comb. nov. *A. Priceae* Britton, Man. 960. 1901. *A. kentuckiensis* Britton, loc. cit.

Several years ago Professor Fernald and Mr. Griscom presented a review of the *Eupatorium rotundifolium* group (Rhodora **37:** 179–181. 1935), in which the plants which had generally been treated as *E. rotundifolium* L., *E. pubescens* Muhl., *E. scabridum* Ell., and *E. verbenaefolium* Michx. were considered to represent four varieties of the single species *E. rotundifolium*. Ten years later (Rhodora **47:** 192–193. 1945) Fernald restored these to specific rank, adding a fifth species, *E. cordigerum* Fern. I feel that the earlier treatment is the more nearly correct. In proposing the name *E. rotundifolium* var. *lanceolatum* (Muhl.) Fern. & Griscom, its authors must have overlooked the earlier name *E. verbenaefolium* var. *Saundersii* Porter ex Britton, which applies to the same entity and thus has priority under Article 58 of the International Rules of Botanical Nomenclature. Porter's name was published as a trinomial without designation of rank,

but since it is well known that in 1901 Britton (the publishing author) recognized neither subspecies nor formae it is obvious that the name is of varietal status. A similar condition obtains with regard to trinomials proposed by many of the earlier botanists, who designated their varieties by Greek letters, without definitely stating their rank.

EUPATORIUM ROTUNDIFOLIUM L. var. **Saundersii** (Porter) Cronquist, comb. nov. *E. verbenaefolium Saundersii* Porter ex Britt. Man. Fl. N. States and Can. 923. 1901. *E. lanceolatum* Muhl. ex Willd. Sp. Pl. **3:** 1752. 1804. *E. rotundifolium* var. *lanceolatum* Fern. & Grisc. RHODORA **37:** 181. 1935. *E. verbenaefolium* Am. auth., perhaps not Michx.

It is also clear that Porter intended his name to be of varietal status, since the original label, in his own hand, bears the notation "Eupatorium verbenaefolium Saundersii, var. nov."

Prenanthes racemosa was described by Michaux as having 8–9 involucral bracts and 9–12 flowers in a head. Plants from New Jersey to Quebec, west to Minnesota and Iowa, agree with Michaux's character, although a more ample series of specimens shows that the range of normal variation in number of involucral bracts and flowers is 7–10 (most commonly 8) and 9–16 (most commonly 13), respectively. It will be noted that the numbers most commonly found are both in the Fabinacci series.

More northern and western plants, ranging from Alberta to Colorado, east to Iowa, Minnesota, and thence less commonly to Quebec and northern Maine, have more numerous flowers and involucral bracts. Here again the Fabinacci series is evident, for the principal involucral bracts are 10–14 (most commonly 13), and the flowers are 17–26 in a head (the number centering about 21).

No other correlated morphological differences between these two groups are readily evident, and in the area where both occur they are likely to be collected and distributed under a single number. Plantae Exsiccatae Grayanae 153, for example, from Aroostook River, Maine, includes plants of both types. Although the number of flowers and involucral bracts in a head has long been known to be important in *Prenanthes* (as, indeed, it is quite generally through the family), the differences here seem clearly to be intraspecific. In view of the fundamental morpho-

logical nature of the differences, combined with the well marked segregation in range, I think it proper to consider the two units as subspecies.

Prenanthes racemosa Michx. subsp. **racemosa** Cronquist, nom. nov. *Prenanthes racemosa* Michx. Fl. Bor. Am. **2:** 83. 1803, sens. strict.

Prenanthes racemosa Michx. subsp. **multiflora** Cronquist, subsp. nov. A subsp. racemosa differt involucri bracteis 10–14 (saepius 13), floribus 17–26.

Type: *Macoun & Herriot 43020*, Beaver Hill Lake, Alberta, August 23, 1906. Representative specimens: Wyoming: *Nelson 8923*. Colorado: *Clements 368*. Montana: *Chickering s. n.* in 1874. Saskatchewan: *Bourgeau s. n.* in 1857–8. Manitoba: *Macoun 22799*. South Dakota: *Rydberg 842*. Minnesota: *Holzinger s. n.* at Winona in 1905. Iowa: *Hayden, Strunk & Tolstead s. n.* in 1933. Illinois: *Mead s. n.* in 1846. Michigan: *Williamson 2267*, from Isle Royale. Quebec: *Victorin 15311*.

The great intraspecific variation in the form and degree of cutting of the leaves of the *Cichorieae* in general and *Lactuca* in particular is well known. *Lactuca Serriola* L., *L. canadensis* L., *L. pulchella* (Pursh) DC., and *L. spicata* (Lam.) Hitchc., for example, are among the species now generally conceded to include forms with pinnatifid leaves and forms with the leaves entire or merely toothed. The varying forms of *L. canadensis* appear in the current manuals as distinct species, but were subsequently reduced to varietal status by Wiegand (Rhodora **22:** 9–11. 1920), whose taxonomic conclusions have been adopted by Fernald (Rhodora **40:** 480, 481. 1938) and others.

Contrariwise, it has become customary to distinguish as separate species *L. floridana* (L.) Gaertn., with pinnatifid leaves, and *L. villosa* Jacq., with merely toothed leaves. To bolster this distinction, it has been alleged that the achene of *L. floridana* has a short stout beak, while that of *L. villosa* is beakless. The fact is, however, that the achenes vary from merely tapering and beakless to distinctly short-beaked, with all intermediate conditions and without any evident correlation with leaf-outline.

Torrey and Gray were well aware of this variation in the achene. They described *L. floridana* (under the name *Mulgedium floridanum*) as having the "achaenia with a short beak", while its un-named var. γ differed only in having its "achaenia very obscurely rostrate". *L. villosa* (under the name *Mulgedium*

acuminatum) was said by them to have the "achaenia slightly rostrate". Their further note under *Mulgedium acuminatum*, "Heads small, nearly as the following species; from which the undivided leaves chiefly distinguish it", is quite in accord with my own observations.

More recently, Deam has made the following comment under *L. floridana* in his Flora of Indiana; "Our manuals describe it as having a short, narrow beak. All of my specimens are beakless, at least none with a beak longer than 0.3 mm."

I conclude that the variation from beakless to shortly stout-beaked achenes is without taxonomic significance in this instance.

The use of the epithet *villosa* for the plant with merely toothed leaves might suggest that it is more hairy than *L. floridana*, but the suggestion is not borne out by the specimens. It is worthy of note that when Asa Gray transferred *Sonchus acuminatus* Willd. (1803) to *Lactuca* (Syn. Fl. **1**[2]**:** 443. 1884), he listed the earlier *L. villosa* Jacq. as a synonym, with the note, "but the plant mostly glabrous or nearly so."

The remaining distinction between *Lactuca floridana* and *L. villosa*, that of the leaves, has been conceded to be not entirely constant, as will be noted by reading the descriptions in the current edition of either Gray's Manual or Britton and Brown's Illustrated Flora. My observations of the leaves are in general agreement with those descriptions. It is possible to refer most of the specimens to one entity or the other by the nature of the leaves, but intermediate specimens exist, and the plants look very much alike in other respects. The range of *L. villosa* is included within that of *L. floridana*, but is apparently less extensive.

The foregoing considerations necessitate the reduction of *Lactuca villosa* to varietal status under *L. floridana*, thus bringing the treatment of these two entities into conformity with that generally used elsewhere in the genus.

LACTUCA FLORIDANA (L.) Gaertn. var. **floridana,** nom. nov. *L. floridana* (L.) Gaertn. Fruct. **2:** 362. 1791, sens strict. *Sonchus floridanus* L. Sp. Pl. 794. 1753.

LACTUCA FLORIDANA (L.) Gaertn. var. **villosa** (Jacq.) Cronquist, comb. nov. *L. villosa* Jacq. Hort. Schoen. **3:** 62, pl. 367. 1798.

Agoseris gracilens (Gray) Kuntze was originally described by Asa Gray (under the name *Troximon gracilens*) as differing from

A. aurantiaca (Hook.) Greene in its narrower leaves and involucral bracts, longer and more slender beak of the achene, and slightly softer pappus. He further noted that *A. gracilens* "resembles slender forms" of *A. aurantiaca*. With the exception of the intangible feature of the pappus, these differences have been largely copied into the current manuals. Unfortunately, there is very little if any correlation between these characters, and the segregation of specimens based on any one of them does not approximate that based on any of the others. Furthermore, the variation in each of them is continuous, with no clear indication of a bimodal curve. Nor have I been able to detect any correlation in range. The variation in size and shape of the leaves is unusual (5–35 cm. long, 1–30 mm. wide, 6–100 or more times as long as wide, rounded to acuminate at the apex), but there are many parallel cases in the tribe, as a survey of some of the species of *Lactuca*, *Sonchus*, *Prenanthes*, or *Taraxacum* will show. I am therefore constrained to reduce *A. gracilens* to *A. aurantiaca*.

Falling, of necessity, with *A. gracilens*, is *A. gaspensis* Fernald. Fernald indicated in his discussion with the original description that the minute technical differences on which he segregated *A. gaspensis* were based on a comparison of the Gaspé plants with the type material of *A. gracilens*. Unfortunately, however, the range of variation of the cordilleran *population* (as distinguished from the type material) encompasses that of the plants from Quebec.

Agoseris aurantiaca, proper, as here defined, ranges from Alta. and B. C. to Calif., northern New Mexico, and probably northern Arizona, and the species is conceded a similar range in the current manuals. Toward the southwestern part of this range, chiefly in Arizona, New Mexico, Utah, and Colorado, but trailing off into Wyoming and southern Montana, occurs a usually recognizable variant which was named *Troximon aurantiacum* var. *purpureum* by Gray. As in *Agoseris aurantiaca* proper, the beak of the achene in this entity varies from barely more than half as long as the body to distinctly longer than the body, and there is a parallel variation in leaf-shape from very narrow and sharply pointed to relatively broad with rounded tip. The proper nomenclatural combination for this southern plant remains to be made.

AGOSERIS AURANTIACA var. **aurantiaca,** var. nov. *Troximon aurantiacum* Hook. Fl. Bor. Am. **1:** 300. pl. 104. 1834. *Agoseris aurantiaca* Greene, Pitt. **2:** 177. 1891. Involucral bracts from not at all purplish to purplish along the midrib and sometimes also finely dotted, rarely conspicuously mottled or blotched, the inner sharply pointed, the outer similar or a little broader and blunter, equaling or a little shorter than the inner. Alberta and British Columbia to California, Utah, northern New Mexico, and probably northern Arizona.

AGOSERIS AURANTIACA var. **purpurea** (Gray) Cronquist, comb. nov. *Troximon aurantiacum* var. *purpureum* Gray, Syn. Fl. **1**^{2}**:** 438. 1884. *Agoseris purpurea* Greene, Pitt. **2:** 177. 1891. Involucral bracts mottled or blotched with purple, conspicuously imbricate, broad, the outer and often also the inner blunt. Arizona, New Mexico, Colorado, Utah, Wyoming, and southern Montana.

When Asa Gray described *Microseris troximoides* in 1874 he named it for its resemblance to *Agoseris* (*Troximon*) *cuspidata* (Pursh) Steud., and noted that "This and *Troximon cuspidatum* indicate a clear transition between the two widely separated genera." The resemblance between the two species, extending to the general appearance, heavy root, crisped, villous-ciliolate leaf-margins, and thin, long-acuminate involucral bracts, is indeed so great that I cannot escape feeling that they are closely related. The only reliable feature to separate them is the pappus, which consists of 10–25 slender, gradually attenuate paleae in *M. troximoides*, and about 40–80 mixed capillary bristles and even more slenderly attenuate paleae in *Agoseris cuspidata.*

With the keen sense of relationships that his extreme splitting of genera and species has led many of us to forget, Edward Lee Greene united the two species concerned, with another which he described (probably a synonym of *M. troximoides*), into a new genus *Nothocalais* (Bull. Cal. Acad. **2:** 54, 55. 1886). *Nothocalais* was merely one of the several groups which Greene's liberal generic views led him to segregate from *Microseris.* Later, Henderson described another valid species, *Microseris nigrescens,* as being "Certainly closely related to *M. troximoides,*" but differing among other things "in the very fine pappus, not half so wide as in that species," and being therefore "A nearer approach still to *Troximon*" (Bull. Torrey Club **27:** 348, 349. 1900).

The affinity between these three species, *Microseris troxi-*

moides, *M. nigrescens*, and *Agoseris cuspidata*, is so plain and so great that any treatment which leaves them in separate genera is unnatural. *Microseris troximoides* and *M. cuspidata* fit well into that genus, if it is defined in the broad sense of Asa Gray rather than in the narrower sense of Greene and Rydberg. *Agoseris cuspidata*, on the other hand, is intermediate between *Agoseris* and *Microseris* in its pappus, and is further anomalous in *Agoseris* because of its beakless achenes. Its nearest relative in *Agoseris* would appear to be the short-beaked *A. glauca* (Nutt.) D. Dietr., but the affinity does not seem particularly great. The achenes of *Microseris* are regularly beakless. It may also be noted at this point that *Microseris Forsteri* Hook., the only species of the genus found in Australia and New Zealand, has the pappus-bristles only slightly dilated at the base, scarcely more so than in *Agoseris cuspidata*.

It seems plain that on both morphologic and phyletic grounds *Agoseris cuspidata* should be transferred to *Microseris*. The proper combination was made many years ago by Schultz Bipontinus (Pollichia **22–24:** 309. 1866). The plant Schultz had in mind was actually *Microseris troximoides*, which was not "discovered" and formally named until 1874, but, nomenclaturally, *M. cuspidata* was strictly a transfer of *Troximon cuspidatum*.

There remains only one species of *Agoseris* with beakless achenes. This is *A. alpestris* (Gray) Greene, which Greene transferred without comment, along with a number of others, when he displaced *Troximon* with *Agoseris*. Its pappus is of capillary bristles, although these are seen to be compressed near the base. Its affinity with *Microseris* § *Nothocalais* is not so plain as that of "*Agoseris*" *cuspidata*, but some specimens show the peculiarly villous-ciliolate leaf-margins, and many of the specimens have one or two reduced cauline leaves well separated from the basal cluster. This latter character is wholly consonant with *Microseris*, but quite foreign to *Agoseris*. The involucre would not be out of place in *Agoseris*, but is distinctly suggestive of *Nothocalais*.

I would be inclined to transfer *Agoseris alpestris* to *Microseris*, thus leaving the development of a beak on the achene of *Agoseris* as a handy technical character to distinguish that genus from *Microseris*, were it not that Dr. Stebbins informs me that in California *A. alpestris* enters into a polyploid-apomictic complex

with *Agoseris glauca*. Here, as elsewhere in the *Compositae*, the genera are not sharply distinct, and species which on their morphology alone are not clearly referable to one or another of a pair of allied genera, must be placed according to their apparent relationship.

Microseris and *Agoseris* may now be redefined as follows:

AGOSERIS: Scapose, or sometimes very shortly caulescent in the annual species, the scape strictly naked above the cluster of leaves at the base (or with one or two reduced upper leaves in *A. alpestris*); involucral bracts subequal or imbricate; achenes evidently beaked at maturity, the beak short and stout or long and slender (beakless in *A. alpestris*); pappus of numerous capillary bristles.

MICROSERIS: Scapose or more or less leafy-stemmed; involucral bracts subequal, imbricate, or calyculate; achenes columnar to fusiform, but scarcely beaked; pappus of 5– many members, these with paleaceous base and slender, bristle-like, naked or plumose tip (intermingled with capillary bristles in *M. cuspidata*).

THE UNIVERSITY OF GEORGIA, Athens, Georgia

A. PROSTRATE RORIPPA.—

RORIPPA ISLANDICA (Oeder) Borbas, var. MICROCARPA (Regel) Fernald, forma **reptabunda,** forma nov., caulibus elongatis repentibus 2–12 dm. longis; foliis plerumque simplicibus. Coös County, NEW HAMPSHIRE: muddy shore of Nash Stream Bog, Odell, 27 August, 1947, *A. S. Pease*, no. 33,162 (TYPE in Herb. Gray.; ISOTYPE in Herb. New Engl. Bot. Cl.); exsiccated shore of First Lake, Pittsburg, 3 September, 1947, *Pease*, no. 33,186.

This striking form, with very long, prostrate 1-sided stems rooting at the nodes and up to 1.2 m. long, its very numerous axillary fascicles with mostly simple leaves, abounds, Dr. Pease tells me, on the exsiccated margins of the two ponds. It is, perhaps, an ecological form, the stems starting growth in shallow water and on drying-out of the ponds, unable to maintain the usual upright habit. On the other hand, plenty of colonies of the species keep the ascending habit under similar conditions.—M. L. FERNALD.

FRUIT KEY TO NORTHEASTERN TREES
(A Reply to a Review by M. L. Fernald)

WM. M. HARLOW

The editor of "Rhodora" kindly reviewed the above publication in the March 1947 number of that periodical. It is the intention of this reply to discuss facts and not to descend to the plane of half-truths and innuendoes.

Perhaps it should be stated that the key was written for beginning students in biology, and not for taxonomists. This is apparent to anyone who reads it, and was so indicated in the preface.

Evidently the reviewer does not like fruit keys as such. For many years foresters, seedsmen, horticulturists, and others have struggled with keys which use, indiscriminately, leaf, flower, and fruit characters. Suppose someone sends you a fruit sample with no branches or leaves, to say nothing of flowers. Just how do you key it in such manuals as "Gray's New Manual of Botany," 7th Ed.? The author, therefore, offers no apology for having attempted to produce a workable key using only fruit characters.

Should a key slavishly follow some system of natural classification and thereby indicate the relationships of the plants included, or should it be a device for quickly and easily determining the identity of an unknown specimen? The reviewer seems to favor the first alternative, the author the second. However, when the reviewer says that *Liriodendron* is keyed out with *Abies*, he is stating only half of the truth, since anyone happening to run out *Liriodendron* at this point is refererred to No. 37 in the key where this genus is included and *illustrated* in its "proper" place among the Angiosperms bearing samaras. The inclusion of *Liriodendron* with *Abies* is only for the neophyte who might pick up a green or newly ripe "cone" of the tuliptree and not sense that it is composed of samaras which soon become detached.

When it comes to the reviewer's suggested separation of *Tsuga* and *Picea*, the force of the saying "that only the dead are consistent" really becomes apparent: N. B. at this juncture the reviewer would have used an exclamation point (!). He states that *Tsuga* has "scattered" leaves, but that in *Picea* they are

"spirally arranged" (the temptation to use an exclamation point is almost irresistible). To check this separation of these genera, the author consulted three authorities; (1) "Gray's New Manual of Botany," 7th Ed., (2) "Manual of Cultivated Trees and Shrubs" by A. Rehder, and (3) Nature, but not necessarily in the order given. Almost unavoidably, some rather astonishing discrepancies between (1) and (2 and 3) were discovered. Gray's Manual states that the leaves of not only *Tsuga* but also *Picea* and *Abies* are "scattered," which may be presumed to mean that they have no arrangement but are borne helter-skelter on the twig. No. 2 agrees with No. 3 that they are all spirally arranged.

The generic key under Pinaceae in Gray's Manual has an error in the leaf arrangement of *Larix* as follows:

> *Leaves in bundles of two or more
>
> 1. PINUS. Leaves 2–5 in each bundle, evergreen.
> 2. LARIX. Leaves many in each cluster, deciduous.

Furthermore, under the generic description of *Larix* the statement is made, "leaves . . . very many in a fascicle, developed in early spring from lateral scaly and globular buds." By contrast, Rehder's statement is wholly descriptive of what one actually finds in nature viz: "leaves spirally arranged and remote on the long shoots, densely clustered on the lateral short spurs." Since the leaves on new growth are single and spirally arranged, it may be presumed that this is also their arrangement on the spurs. The appearance of "whorls" or "clusters" is due to the extremely slow growth in length of these dwarfed branches. To refer to larch leaves as "fascicled" or in "bundles" as are those of the pines, promotes error and confusion.

About the only actual errors the reviewer could find (there were some he failed to see) were those of indiscriminate use of upper and lower case in common names. The author is glad to have these called to his attention and has already corrected them in the new printing of the key. Even here, however, the reviewer was careless in quoting "Chinese-sumac." The hyphen was necessary because "Chinese-" came at the end of a line and "sumac" began the next line. "Chinesesumac" was indicated, not "Chinese-sumac."

If they like, the authors of "Standardized Plant Names" may reply to the comments on "that presumptuous model." Its saving grace is that when a student sees the names osageorange, tanoak, and pineapple, he knows that the first is not an orange, the second is not an oak, and the third is not an apple. By the way, does the reviewer spell pineapple "pine" "apple" and if not, why not?

Evidently the author's primary error was in sending a copy of the key to "Rhodora" for review. It was his misconception that the magazine was actually "devoted primarily to the flora of the Gray's Manual Range and regions floristically related." In his opinion, a key based upon fruit characters fell within these limits.

The New York State College of Forestry,
Syracuse, New York.

GENERIC STATUS OF TRIODANIS AND SPECULARIA

Rogers McVaugh

In Rhodora for September, 1946, Professor M. L. Fernald discussed in detail the case of "*Triodanis* versus *Specularia*"[1], concluding that as a genus *Triodanis* "seems . . . very weak." He advocated the reunion of *Triodanis* with the European genus *Specularia*, in accordance with the policy established by Alphonse DeCandolle in 1830 and subsequently followed by practically all European workers and most Americans. Professor Fernald's conclusions were reached after examination of my earlier paper on *Triodanis*[2], and his objections to the maintenance of the group as an independent genus were based chiefly upon what he called the "reputed generic differences" which he understood to be summarized in two paragraphs of this earlier paper. He felt that these "differences" did not include constant strong morphological characters, and he considered that some of them had been over-stressed or were, indeed, meaningless as set forth. He showed to his own satisfaction that *Triodanis* was not to be considered "a clearly distinct genus" (that is, distinct from *Specu-*

[1] Rhodora 48: 209–214, 215, 216. pl. 1049, 1050.
[2] Wrightia 1: 13–52. 1945.

laria), but apparently he did not consider what I believe to be the main issue, the existence of either *Specularia* or *Triodanis* as a real entity apart from *Campanula*.

The case for *Triodanis* has already been set forth at length, in the paper referred to above, but I think it worthwhile to reopen the discussion here in the pages of RHODORA, because of my own conviction that *Triodanis* constitutes a biologically coherent group of species which is as well founded as most genera of the *Campanulaceae* and which should be recognized as an independent genus. One infers from Professor Fernald's article that *Specularia* will be used in the traditional, inclusive sense, in the forthcoming 8th edition of "Gray's Manual," and it would seem unfortunate to have this generic name perpetuated indefinitely, through the undoubtedly enormous influence of the "Manual," without some further examination of the qualifications of the genus.

In the first place it may be reiterated that there is no justification whatever for maintaining *Specularia*, in its traditional circumscription, as a genus apart from *Campanula*. It is neither sharply delimited nor homogeneous, and its components are evidently less closely akin to one another than to *Campanula* itself. If the inclusive *Specularia* be dismembered, however, as suggested previously[1], and restricted to the type-species and one other, it may be maintained as a weak segregate from *Campanula*. To quote my own words (*Wrightia*, l. c.): "The desirability of recognizing *Specularia* as a genus is still [after dismemberment] open to question, but the combination of divided corolla, elongated capsule and glabrous filaments is unique among the annual species of the *Campanula* complex, and these similarities may indicate some generic affinity between the two entities involved [i. e. the two original species of *Specularia*, *S. Speculum-Veneris* and *S. hybrida*], although these [species] are superficially dissimilar in aspect, degree of branching, and size and shape of flowers".

The weakness of *Specularia* as a genus was recognized by Alphonse DeCandolle, whose *Monographie des Campanulées* (1830) has been the foundation for all subsequent work on the *Campanulaceae*. Of the species of *Specularia* DeCandolle wrote (*Monographie*, p. 46, here translated from the original French):

[1] **Wrightia 1: 17. 1945.**

"They form a group very near the Campanulas, and distinct more by the habit than by any positive characters". He went on to explain that in spite of analogies between species of *Specularia* and similar species in *Campanula*, he had experienced no difficulty in distinguishing the two genera "except for the one species *C. fastigiata* Duf., which is so intermediate, in habit and other characters, that one can at will place it in the one genus or the other". One certainly cannot quote DeCandolle in support of insistence upon strong morphological characters as generic criteria in the *Campanulaceae!*

It is worthwhile here to examine in some detail the philosophical concepts employed by DeCandolle in delimiting the genera of *Campanulaceae*, since his *Monographie* remains the latest significant or original work on the family as a whole. The compilations of Endlicher, Bentham & Hooker, and Schönland, as far as these relate to the *Campanulaceae*, are taken over from DeCandolle's work without any important changes. Endlicher's *Genera* (1838) followed the *Monographie* even as to the sequence of genera, and without any change in generic concept. Bentham & Hooker (*Genera*, vol. 2, part 2, 1876) accepted DeCandolle's genera as delimited by him, except that they submerged the monotypic *Petromarula* in *Phyteuma*, explaining its earlier separation on the basis of mistaken observation on the part of DeCandolle. Schönland likewise (in Engler & Prantl, Natürl. Pflanzenf. **4:** part 5, 1894), used DeCandolle's genera essentially unchanged; like Bentham & Hooker he added certain genera discovered since 1830, and like them he submerged *Petromarula.*

In writing on the delimitation of genera DeCandolle was emphatic that he did not set up these groups merely because they could be separated from related groups by arbitrary characters; to him a genus was a natural unit, recognizable by its own combination ["*ensemble*"] of features. The coherent anthers of *Symphyandra* were not enough in themselves to establish the group as a genus; he pointed out (*Monographie*, p. 47) that it was "besides natural enough as to habit and other characters". He summed up his practice in the following words (p. 64): "I have not kept or established any genus which was not founded at the same time on positive characters and on the habit [*le port*], or, in other words, on the reproductive organs and those of vegetation".

In the case of *Specularia*, as he said himself, the genus depended more upon the habit than upon the positive characters! Nor is this the only case in point: of *Platycodon* and *Microcodon* he wrote that these were not separated by any strong characters (p. 63), but "unhappily, their habit is so different that one is forced thereby to make two distinct genera". Yet *Specularia*, *Platycodon* and *Microcodon*, founded as they were without any strong morphological basis, but recognizable chiefly by their *ensembles* of characters, were accepted without question by Endlicher, Bentham & Hooker, and Schönland.

DeCandolle was fully aware that the genera of *Campanulaceae* are interrelated in a reticulate pattern (*Monographie*, p. 64). He pointed out that the ill-defined genus *Campanula* constitutes a sort of center in the group to which it belongs: "[It] has around it the genera *Specularia*, *Adenophora*, *Symphyandra* and *Michauxia*, which are very close to it [*qui en sont très rapprochés*], and which touch at each of its subdivisions . . . All are closer [*plus voisins*] to the genus *Campanula* than to one another. Thus whatever linear series be adopted, it will necessarily be imperfect on this point." I am in full agreement with the thought expressed in this quotation, and to the genera enumerated by DeCandolle I should add *Triodanis;* whether it be considered an independent genus or not, it seems no more closely related to *Specularia* (in the restricted sense) than to other annual species of *Campanula.* This was discussed in *Wrightia* (l. c.), and some of the following discussion bears on the same question.

The above remarks should be enough to make clear my first point, which has to do with the manner of delimitation of genera in the *Campanulaceae.* The genera in this family stand independently only when their coherence makes them biological units, recognizable to us by some combinations of characters which do not appear elsewhere in the family. There are a few genera like *Adenophora* and *Downingia* which are possessed, in addition, of distinctive morphological characters, sufficient without any additional evidence to set these genera apart. There are also some 30 monotypic genera which are unique or not according to the opinions of individual systematists, and which are founded for the most part upon single characters of doubtful or minor import. In the great majority of cases, however, the most important thing

about each genus, from the standpoint of classification, is its own existence as an entity, not some arbitrary and possibly quite meaningless difference between it and some other group. The genera of *Campanulaceae*, much as we should like them to constitute natural biological groups, are still more or less artificial, delimited partly for the sake of convenience (we do not know, for example, that the coherent anthers of *Symphyandra* have any particular phylogenetic significance, but it is convenient and apparently natural to assemble under this name all the species having this character), and nothing can improve our system of classification more than full realization of this. If we are to depend upon what may be called the method of delimitation of genera by separation, by splitting blocks off the corners of some larger mass, by arbitrary quantitative differences which are easily measured and applied to limited numbers of specimens, then we shall lose sight of the biological implications of classification. In contrast it is possible usually to delimit genera most satisfactorily as it were by accretion, by building around natural centers of population as determined by studies of morphology or by the use of whatever techniques may be available. With emphasis placed upon similarities and affinities, rather than upon differences, it should be possible for systematists to arrive at schemes of classification more generally acceptable to their colleagues and to the general public.

The above applies specifically to the *Campanulaceae* (including the *Lobelioideae*), but I judge that it is equally applicable to most other plant-families, or perhaps to all of them. *Fragaria*, for example, is none too solidly founded on morphological grounds; it is, in fact, about as distinct from *Potentilla* as *Triodanis* from *Campanula*. But what could constitute a better genus than *Fragaria*, homogeneous as it is, and comprising several species all exhibiting the same combinations of traits? Examples of similar cases in other plant-families could be multiplied, but note merely how it applies to *Triodanis;* again the following quotation is from *Wrightia:* "The combination of annual habit, deeply divided corolla, capsule longer than wide and opening near the apex, spicate inflorescence, and regular production of cleistogamous flowers at the lower nodes is a unique one, and when found in a relatively large number of species surely points to a genetic dis-

continuity that may be called a generic distinction". The characters of *Triodanis* individually are not particularly strong; each of them (with the possible exception of the pattern and rhythm of the cleistogamy) has its counterpart or near-counterpart in *Campanula.* There is thus no sharp break between *Triodanis* and *Campanula,* but neither is there a sharp break between *Aster* and *Erigeron*[1]; there IS such a hiatus between *Triodanis* and *Specularia,* but none between the latter and *Campanula.* Neither *Specularia* nor *Triodanis* can be maintained as genera distinct from *Campanula* except through primary emphasis on the stature given them by their collective features, but if one wishes he can distinguish technically between the two as follows, understanding that the differentiating characters are quite possibly minor ones which CONFIRM rather than AFFIRM the generic distinction emphasized by the *ensemble:*

TRIODANIS: Filaments ciliate at base; central flowering axis and those of the main branches spicate; flowers at the lower fertile nodes prevailingly cleistogamous.

SPECULARIA: Filaments glabrous; plants normally diffusely branched, the flowers clustered near the tips of the branches or corymbosely aggregated at the summit of the plant; flowers all corolliferous.

With the above in mind, we may consider some of the morphological characters which together define *Triodanis* and *Specularia,* in the light of Professor Fernald's remarks. Before any detailed consideration I must make public apology for careless presentation in my earlier paper. On pages 13 to 20 of the first volume of *Wrightia* were set forth what I took to be sufficient technical data and philosophical considerations to justify the acceptance of *Triodanis* as a genus. To these were added, on pages 20 and 21, synopses to facilitate comparison of the features of *Campanula, Heterocodon, Specularia,* and *Triodanis.* These synopses emphasized not only differences between the genera but also qualifying and parallel conditions. They were not intended, as Professor Fernald seems to have assumed, to stress individual diagnostic characters; nor were they for use as a key to genera, as their perhaps unfortunate position at the beginning of the section entitled "Systematic Treatment" may have indicated. My own position in the matter was clearly stated, although evi-

[1] See Cronquist's remarks on this, in Brittonia 6: 122–123. 1947.

dently not sufficiently emphasized, on page 20: "It will be noted [i. e. in the following synopses] that the generic characters of the groups segregated from *Campanula* are all weak ones, in no case involving strong morphological features which absolutely separate them from the more inclusive genus, but always depending upon combinations of weaker characters which reappear individually in unrelated species of *Campanula*".

I must make further apology for not describing more precisely what Professor Fernald implies is a sort of neo-Rafinesquian distinction. This is the matter of the quite different types of branching exhibited by species of *Triodanis* and *Specularia*, respectively. In contrasting these two groups, I carelessly omitted mention of the rather obvious fact that both branch freely from the very base or near it, when the plants are growing under favorable conditions. As Professor Fernald infers, this type of branching is to be expected in annual weedy plants, and is of no importance as a taxonomic character in this case. Quite different, however, is the branching of the central flowering axis, which is spicate in *Triodanis* and corymbosely branched in *Specularia*. It is true that the growth of lateral branches in *Triodanis coloradoensis* may obscure the "racemose" condition of the axis, but this last may still be discerned on most of the branches in specimens except vigorous old fruiting plants; even in these, as in Professor Fernald's plate designed to show the opposite condition (plate 1050), the "racemose" tendency is evident on the lower branches. It is of course to be remembered that truly racemose branching does not occur in the *Campanulaceae* proper, the spike of *Triodanis* being apparently a derived inflorescence-type which is fundamentally determinate, and in which the single-flowered nodes are so because of abortion of potentially active branch-buds below the terminal ones, each solitary axillary flower representing an axillary branch reduced to this extent. Under conditions favorable for growth these branches may elongate and produce several flowers, or branch again, excessive stimulation occasionally causing the development of plants suggesting some really different species[1]. The branching of *Triodanis*, as discussed in *Wrightia* (l. c. 23–24), follows a definite pattern but evidently

[1] As in *Campanula americana*, a species with a spicate inflorescence very similar to that of *Triodanis*; see Bartonia 23; 37–39. 1945.

is not fundamentally different from that of other campanulaceous genera. It serves none the less as an important diagnostic character if it be remembered that it may be influenced by environment, although primarily under genetic control.

The branching in *Specularia* (as the genus was restricted in *Wrightia*, is essentially like that in many other annual campanulaceous plants. Branches from the upper axils are the rule rather than the exception, so that the flowers are usually in small groups or solitary at the tips of slender branches, the whole forming a diffuse or clustered but definitely branched inflorescence, and the terminal flower often being exceeded by the growth of the lateral branches and more or less immersed in the inflorescence. The "racemose" condition is approached, as it may be in most annual and many perennial species of *Campanula*, in imperfectly developed plants. Through the kindness of Dr. Charles Baehni, I have seen the Gittard specimen cited by Boissier (Fl. Orient. **3:** 959. 1875) as the type of *Specularia Speculum*, var. *racemosa*, to which Professor Fernald refers. The plant is not a stunted or starved specimen, as I had speculated, but one in which the usual lateral branches from the upper part of the main axis are all equally very short (3–5 mm. long) and tipped each with a cluster of 3 or 4 flowers. The resulting inflorescence is "racemose" about to the same extent as that of *Solidago Virga-aurea;* it is long and slender, with numerous short flowering branches. It is by no means "ut in *Sp. falcatâ* racemosa" as Boissier said, unless one wishes to stress (it seems to me unduly) the homology between the normally reduced, one-flowered branches of the "raceme" of *Sp. falcata*, and the abnormally reduced, several-flowered branches of this one specinem of *Sp. Speculum-Veneris*. I take it that the strength or weakness of any genus lies in what its species usually or regularly have in common, not in abnormal plants which may vary markedly in one character or another from their closest relatives. Such aberrant individuals may offer valuable clues in regard to past evolutionary connections between species or genera, or in regard to evolutionary tendencies, but hardly suffice in themselves to determine generic limits in present-day populations.

Professor Fernald argues that the mere existence of cleistogamy

in *Triodanis* is not enough in itself to justify the separation of *Triodanis* and *Specularia*. He cites several genera in different plant-families, suggesting that in *Utricularia, Panicum, Viola,* and *Danthonia* the mere occurrence of this trait in certain species does not justify the generic segregation of these species from the more inclusive groups. He is of course amply justified in this view, but strict analogy and adherence to his expressed views would then suggest the union of *Triodanis* not with *Specularia* but with *Campanula,* where cleistogamy does occur in some species (as far as I am aware, no one has suggested that these should be separated off as a distinct genus because of this one trait!). It is of course not the mere occurrence of cleistogamy but the unique pattern of its development in *Triodanis,* when correlated with other characters, that is noteworthy. Many individual plants of *Triodanis coloradoensis*, for example, produce all corolliferous flowers, but the many others that show cleistogamy follow the development-pattern of the other species of the genus, indicating their biological affinity to these rather than to *Specularia,* in which the approach to the cleistogamous condition appears to be analogous, rather than homologous, to that in *Triodanis.*

In the past the principal supposed distinction between *Specularia* and *Campanula* has been in the capsule, that of the former genus often having been referred to as cylindric, or oblong, or perhaps most often as linear (the latter by Boissier, l. c. 958, by Bentham & Hooker, l. c. 562, and by McVaugh, l. c. 21). Professor Fernald truly points out that there is great variation in the capsules of these species; actually one can find in almost any species of *Specularia* or *Triodanis* individual plants which have the supposed (relatively) broader capsules of *Campanula,* or the narrower ones of the segregate genera. One can not with reason remove either genus from *Campanula* (or separate them from each other) on the basis of capsule-shape. The character is of little use except in descriptive matter, and I regret that my earlier paper did not make this clear even to the superficial reader.

It is worth noting, since the recognition or non-recognition of a given genus depends so largely upon tradition and the weight of authority, that in maintaining *Triodanis* one does not necessarily label himself a disciple of the eccentric Rafinesque. The recog-

nition of the American "Specularias," as a group distinct from the European ones, seems to have begun with DeCandolle (*Monographie*, p. 47, 351), who felt that the one American species recognized by him constituted a "distinct section" (to which he gave no name). It may be argued, if one cares to resort to a syllogism, that this section occupied a place in DeCandolle's scheme of classification approximately equivalent to those occupied by sections in other genera (e. g. Sect. *Edraiantha* of *Wahlenbergia*, and Sect. III of *Phyteuma*)—sections that were soon recognized as independent genera. The astute Boissier, for example, maintained *Edraianthus* as a genus in the *Flora Orientalis*, and took up George Don's name *Podanthum* for what DeCandolle had regarded as a section of *Phyteuma*. Both *Edraianthus* and *Podanthum* (i. e. *Asyneuma* according to current rules of nomenclature) are now widely accepted as good genera. Whether or not this strengthens the case for the recognition of *Triodanis*, the fact remains that the group received a formal designation in Endlicher's *Genera* in 1838 (*Specularia*, sect. *Dysmicodon*). Thomas Nuttall, who knew the American flora well and was by no means without judgment, soon elevated this section to generic rank as his genus *Dysmicodon*[1]. In support of this view he said: "Nearly allied to *Specularia*, but with a different habit, calyx and seed; and with the lower flowers apetalous and reduced in the number of their parts". In the same paper Nuttall went so far as to propose a second segregate (as he thought from *Specularia*), comprising one species, *Campylocera leptocarpa*. This genus he supposed to be founded chiefly upon the unilocular, laterally dehiscent capsules of most of the imperfect flowers. As has previously been explained in *Wrightia* (pp. 50–51), Rafinesque seems to have "stolen" the idea for his species *Triodanis scabra* from Nuttall's annotated specimen, and it is entirely possible that the idea of the genus itself was not original with Rafinesque.

Nuttall's genera *Dysmicodon* and *Campylocera* were taken up by John Torrey, who was anything but eccentric and who apparently espoused Nuttall's proposals with full realization of what he was doing, for he had used the name *Specularia* in his earlier publications and formally designated the American species as a

[1] **Trans. Am. Phil. Soc. n.s. 8: 255. 1843.**

distinct group, sect. *Triodallus*.[1] Torrey seems to have been using *Campylocera* as late as 1870, if one may judge by his annotation on Palmer's no. 168, *Triodanis Holzingeri*, now in the U. S. National Herbarium.

More widespread recognition and use of the names *Dysmicodon* and *Campylocera* was doubtless prevented by the influence of Asa Gray, who published a footnote-monograph on "*Specularia*" in 1876[2]; *Campylocera* was used by C. C. Parry in a paper published in 1872[3], but so far as I am aware no one publicly questioned the integrity of the inclusive *Specularia* from that time until the days of E. L. Greene.

I should like to close this paper with an illustration from another group of the *Campanulaceae*, the subfamily *Lobelioideae*, in order to emphasize once more the fact that campanulaceous genera (and most other genera, as far as my observations go) in the great majority are founded not solidly upon strong morphological separations, but solidly upon what appear to be natural combinations of characters, in the tradition of Alphonse DeCandolle.

Recent opinions estimate the number of genera of *Lobelioideae* in North and South America together at about 12 to 15 (excluding *Cyphioideae*)[4]. From all the others *Lysipomia* and *Downingia* stand clearly apart as independent genera differentiated by strong morphological characters. *Howellia* is a monotypic, aquatic genus of restricted distribution, distinct because of its seeds which are several times larger than in any other known genus of the family. All the remaining lobeliaceous genera (12 according to one estimate) can be referred to *Lobelia* (those with capsular fruits) or to *Centropogon* (those with baccate fruits) without significant additions to the morphological features of these genera as currently understood! These minor genera may be founded upon a single character (e. g. *Heterotoma*) or upon an assemblage of weak characters (e. g. *Diastatea*); some are doubtless real entities deserving of recognition, others are so weak that hardly more than tradition keeps them alive, but even these border-line

[1] Fl. N. Y. **1**: 428. 1843. For use of *Dysmicodon* and *Campylocera* see Rep. Pac. R. R. Surv. **4**: 116. 1857, and Rep. Mex. Bound. Surv. 108. 1859.

[2] Proc. Am. Acad. **11**: 81–83.

[3] Rep. Hayden Surv. 1870 [4th Ann. Rep. U. S. Geol. Sur. Terr.]: 486.

[4] North Am. Flora **32A**[1]: 1–134. 5Ja 1943; Das Pflanzenreich **IV.** 276b (heft 106): 37–40. 25My 1943.

genera can hardly be merged with their supposed relatives until we know more about what a genus really is, and how it is constituted. *Triodanis*, in my opinion, is as well founded as the average genus in its family, and should be maintained unless we are to have a very severe general reduction in the number of genera recognized in the *Campanulaceae*.

University Herbarium, University of Michigan,
Ann Arbor, Michigan.

A NOVA SCOTIAN DWARF SHADBUSH

M. L. Fernald

Amelanchier **lucida** (Fernald), stat. nov. *A. stolonifera* Wiegand, var. *lucida* Fernald in Rhodora, xxiii. 267 (1921).

When this shrub of sandy or peaty barrens and gravels of Nova Scotia was described I placed it with *A. stolonifera* Wiegand, not then fully understanding how constant (except in hybrids) is the presence of dense tomentum on the summit of the ovary, this character practically invariable in the following stoloniferous or surculose species in eastern North America: *A. alnifolia* Nutt., *A. humilis* Wiegand, *A. mucronata* Nielsen, *A. gaspensis* (Wiegand) Fernald & Weatherby, *A. stolonifera* Wiegand and *A. Fernaldii* Wiegand. When the lustrous-leaved shrub of Nova Scotia was discovered by Long and me I wrote:

> one of the neatest little shad bushes we ever saw, a beautiful shrub with stoloniferous habit, low stature (3–6 dm.) and nearly orbicular dark-green, highly lustrous leaves. Afterward, at Grand Lake, Halifax County, at Springhill Junction in Colchester County, at Middleton in Annapolis County and at various places westward we found it a thoroughly distinct and dominant shrub of barrens, either dry or wet. In habit it resembles *A. stolonifera* Wiegand,[1] a characteristic shrub from Maine to Virginia and in eastern Newfoundland, with dull and pale-green or glaucous foliage and with the summit of the ovary densely tomentose; but this characteristic Nova Scotian shrub with dark, glossy leaves has the summit of the ovary wholly glabrous, though it is sometimes arachnoid or sparsely pubescent. Typical *A. stolonifera* we found in Nova Scotia, though only once; but the common shrub is so well marked that it should be separated as a variety.—Fernald, l. c. 130 (1921).

The dark green and lustrous coriaceous leaves are so unlike those of *Amelanchier stolonifera* that the shrub can not properly

[1] Wiegand in Rhodora, xiv. 144 (1912).

be treated as belonging to that species, and the glabrous summit of the ovary is all wrong. Furthermore, the terminal overwintering buds of *A. stolonifera* are reddish-brown and only 6 or 7 mm. long. We have no fully developed terminal buds of *A. lucida*, but a vigorous shoot, collected on September 8, shows a slenderly lance-acuminate yellowish bud essentially 1 cm. long. Autumnal material, most kindly secured for me at the type-locality by Professor Horace G. Perry, has the new leaves already pushing out after a very warm September. So far as the bud-scales show they are like those just noted. Neither do we know the flowers of *A. lucida*, but the fruit, of which we have an abundance, is scarcely that of *A. stolonifera*. In the latter the mature pedicels are pubescent, the mature hypanthium 3–4 mm. in diameter, the mature sepals recurved. In *A. lucida* the pedicels are glabrous, the mature hypanthium 5–7 mm. in diameter, the sepals erect.

Only two low and strongly stoloniferous species of the genus are recognized in eastern North America, in which the summit of the ovary is glabrous. One is the characteristic little *Amelanchier obovalis* (Michx.) Ashe, which was discussed and illustrated in RHODORA, xliii. 566, pl. 672, fig. 3 (1941), a colonial species of pinelands from Georgia and Alabama north to eastern Maryland, southeastern Pennsylvania and southern New Jersey (and at the eastern edge of the Alleghenies in Virginia). Here is the real relationship of *A. lucida*. From *A. obovalis* the latter differs in the pale (instead of reddish-brown) terminal overwintering buds; its coriaceous, dark green and lustrous (instead of membranaceous, pale green and opaque) leaves; its fruiting raceme with glabrous (instead of pubescent) rachis and pedicels; the longer pedicels 1–2.5 cm. (instead of 3–12 mm.) long; hypanthium 5–7 (instead of 2–3) mm. in diameter; the fruit obviously longer.

The other species, found on a remnant of the Atlantic Coastal Plain midway between the northern limit of *Amelanchier obovalis* and the Nova Scotian area of *A. lucida*, is the endemic *A. nantucketensis* Bicknell in Bull. Torr. Bot. Cl. xxxviii. 453 (1911), a species which in its morphological characters is midway between *A. obovalis* and *A. lucida*. In outline and texture of mature leaves and diameter of hypanthium it is similar to *A. obovalis* but the expanding leaves are glabrous or promptly

glabrate (instead of heavily white-tomentose) beneath; the mature leaves sublustrous above (instead of dull); racemes lax and 2–4.5 cm. long, with glabrous or promptly glabrate rachis and pedicels, the longer pedicels 1–2 cm. long (in *A. obovalis* the rather dense racemes 1–3 cm. long, the flowering pedicels white-tomentose, the fruiting ones pilose, the longer ones 3–12 mm. long); sepals 2–4 mm. long, soon recurving (in *A. obovalis* 1–2 mm. long, erect or tardily spreading); petals linear-oblanceolate, frequently involute (in *A. obovalis* narrowly elliptical and flat).

From *Amelanchier nantucketensis* the Nova Scotian *A. lucida* differs in its coriaceous and highly lustrous oblong, broadly elliptic or subrotund (instead of membranaceous and less lustrous elliptic-oblong to oblong-obovate) leaves 1.5–6.5 cm. long and 1–4 cm. broad (instead of only 2–3 cm. long and 1.5–2 cm. broad); sepals remaining erect (instead of recurving); hypanthium 5–7 mm. (instead of 4–5 mm.) in diameter.

Although in his monograph of *Amelanchier* Dr. G. N. Jones treated *A. nantucketensis* as the nonstoloniferous fastigiate tall shrub or tree, *A. canadensis*, and *A. lucida* as one of the many shrubs under the inclusive *A. spicata* sensu G. N. Jones, not K. Koch, the glabrous summit of the ovary clearly shows that *A. lucida* does not belong in that miscellaneous complex with the summit of the ovary tomentose. The permanently attached identification-labels on the Gray Herbarium sheets of the dwarf and stoloniferous *A. obovalis*, with the identifications marked as *A. canadensis*, indicate that in case of *A. obovalis*, maintained in his publication by Dr. Jones, there must have been an error in so misidentifying a large number of sheets.

As here interpreted, the three dwarf and stoloniferous colonial species with glabrous summits of ovaries make up a series of chiefly Coastal Plain dispersal: *A. obovalis* following the Coastal Plain (but rarely found inland) from Alabama and Georgia to eastern Maryland, southeastern Pennsylvania and southern New Jersey; *A. nantucketensis* isolated on Nantucket, more than 250 miles to the northeast; *A. lucida* endemic in Nova Scotia, another 250 miles farther to the northeast. This disruption of range suggests derivation in the North off the now submerged continental shelf, a derivation evident in many scores of other cases.

Campylium Halleri in New Brunswick.—The canyon at Grand Falls, N. B. still proves to be a good collecting ground especially in the hardly accessible places. Here, while working over a group of relatively dry ledges covered with *Hygrohypnum palustre* (Hedw.) Loeske, the writer again encountered *Hypnum fastigiatum* Brid. But of still greater interest was a near-by associate, a little golden-green *Campylium* with recurved leaves. Microscopical examination showed this to be *Campylium Halleri* (Hedw.) Lindb.: *Habeeb* 740, on relatively dry ledges in shade, Grand Falls, N. B., July 3, 1947.

The writer wishes to make the following correction. In the Acadian Naturalist, Vol. I, No. 4 of Nov. 1944 page 189, the writer listed *Leptodictyum trichopodium* (Schultz) Warnst. var. *Kochii* (B. S. & G.) Broth. This should have been *Campylium radicale* (Beauv.) Grout.

The species of *Campylium* collected so far by me in the vicinity of Grand Falls are *C. chrysophyllum* (Brid.) Bryhn, *C. Halleri* (Hedw.) Lindb., *C. hispidulum* (Brid.) Mitt., *C. hispidulum* var. *Sommerfeltii* (Myrin) Lindb., *C. polygamum* (B. S. & G.) Bryhn, *C. radicale* (Beauv.) Grout, and *C. stellatum* (Hedw.) Lange & C. Jens.—Herbert Habeeb, Grand Falls, New Brunswick.

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Gray Herbarium of Harvard University, Cambridge 38, Mass.

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BLEPHILIA CILIATA (L.) BENTH.

H. A. Gleason

In the process of altering generic limits, which necessarily entails a relocation of species, botanical writers have often neglected to make the new binomials. Well known instances are to be found in Bentham and Hooker's Genera Plantarum, where the necessary binomials are almost entirely omitted. Nevertheless, they appear in the Index Kewensis as if they had been made and are credited to Bentham and Hooker. According to a common custom, we still credit them to these men but cite the Kew Index as the place of publication.

It is only an assumption on our part when we write B. &. H. as the authority. How do we know whether they would have used these specific epithets or not? Our assumption, based on other experience with Bentham or Hooker, is probably correct, but the fact remains that they did not make the transfer and that Jackson did it for them.

Blephilia ciliata illustrates another instance of a citation based on an assumption. It is and has been regularly cited to (L.) Raf. in all recent standard works. Before double citations came into vogue it was referred directly to Rafinesque. Its history is simple.

The genus *Blephilia* was established by Rafinesque in 1819 in a long critique of Nuttall's Genera. He wrote: "7. *Monarda ciliata* must form a new genus, which we call *Blephilia*, distinguished by an unequal calyx." This sentence may be accepted

as a foundation for the genus and for the designation of *M. ciliata* as its type species, but the binomial *B. ciliata* does not appear.

During the next fourteen years Eaton and Torrey refused to recognize the genus and maintained one or the other of its two species under *Monarda.*

In 1833 Bentham took up *Elephilia* in his monograph of the Labiatae and admitted as one species *B. ciliata*, which he credited to Rafinesque in the Jour. de Physique, etc. Here is the full text of Rafinesque's statement in that place: "Le type de ce genre est la *Monarda ciliata*, Linn." Again the binomial does not appear.

Bentham's reasoning is easily understood by us, since we frequently adopt it ourselves. He merely concluded that Rafinesque would have used the epithet *ciliata*, but simply did not, possibly not considering it necessary. Rafinesque has always been considered an eccentric or erratic botanist; could Bentham read his mind correctly? Let us see.

I do not know that Rafinesque mentioned the genus again during the thirteen years following its sketchy publication. But in 1832 he published in the Atlantic Journal (p. 146) a criticism of some of Torrey's work, in which appears this brief statement: "*Blephilia beckii* Raf. *monarda ciliata* T." Here he definitely showed that he had no intention of using *ciliata* as the specific epithet for the plant.

In 1838 appeared the last part of Rafinesque's New Flora, with two new species of *Blephilia* actually described. Under the first one, *B. brevipes*, he says: "One of the sp. blended in *Monarda hirsuta*, the real sp. is my *Bl. nepetoides*, a 3d is the next." The next was his second new species, *B. lanceolata.* Note that the "real" species in the original *M. hirsuta* is "my *Bl. nepetoides;*" he changed its specific name. By "blended" he clearly meant the mixture of three species under one name; in sorting them out he made new names for all of them. Then he goes ahead to say, in almost identical words: "There are also 3 sp. blended in *Monarda ciliata*, my *Bl. pratensis*, *brevifolia* and *heterophylla.*" Clearly and obviously, Rafinesque intended to give new names to all three, again discarding *ciliata* as completely as he had discarded *hirsuta* in the preceding sentence.

Bentham's assumption of Rafinesque's intention was therefore erroneous. So are our assumptions when we credit this binomial to him. He never made it and disclaimed intention of making it. The correct citation for our familiar plant is (L.) Benth.

Incidentally, it may be mentioned that *B. hirsuta* is credited to Torrey by Britton & Brown, Small, and Rydberg. As a matter of fact, Torrey used the name *Monarda hirsuta* for the species; the combination *B. hirsuta* does not appear, and the genus *Blephilia* is cited only as a synonym. The citation in Gray's Manual as (Pursh) Benth. is correct.

All of this serves to bring up the general question as to how far we may go in using the name of another botanist in making or transferring names. May I describe a species and credit it to Linnaeus, on the assumption that he would have considered it a species and would have selected this epithet for it if he had ever known the plant? It would certainly gratify my vanity to read the citation *Miconia ficta* L. ex Gl. and it would open a way for scores of our modern precisionists to show their intimate spiritual communion with the past masters of botany.

Now I have taken one of the old masters into partnership and have described a few species of melastomes which I have accredited to Cogn. and Gl., although Cogniaux had been dead a quarter of a century. But the circumstances were different. Here was a sheet of preserved specimens, on which Cogniaux had noted the plant as a "sp. nov.," often with a specific name also added. When I examined the same plant I agreed that it was undescribed; I proceeded to draw up and publish a description, using Cogniaux's name for it, but adding my own name to his in the citation, since I was alone responsible for the wording of the description and for remarks on the probable relationship of the plant to other species.

It seems to me that we have no right to attribute a new name or a new combination to another author unless we have clear and indisputable evidence of his intentions. I regret saying this, because it might easily induce some of our professional nomenclaturists to search the literature for combinations made on assumptions similar to those of Bentham, and to make new names accordingly.

The New York Botanical Garden

A VIRGINIAN PELTANDRA

M. L. Fernald

In Rhodora, xlii. 360 and 430–432, plate 627 (1940), I pointed out the many striking characters which distinguish a species of *Peltandra* of bottomlands and wooded swamps of southeastern Virginia, thence locally southward (characteristic material before me from upland Georgia and from Florida). Whereas the common and wideranging *P. virginica* (L.) Schott & Endl. has the green or barely pale-bordered undulate-margined spathe tightly inrolled around the white or whitish spadix with staminate flowers usually extending to the tip, the plant of Prince George and Sussex Counties (presumably in adjacent counties) of southeastern Virginia has the limb of the spathe green only near the middle of the back, the open to spreading white border 1–1.7 cm. wide each side of the middle band, the orange-yellow spadix exposed and with the terminal 1–3 centimeters naked. The spathe of *P. virginica* at anthesis is (1.1–)1.3–2.5 dm. long, in the plant of southeastern Virginia 0.9–2 dm. long. In *P. virginica* the lower fourth of the flowering spathe is continuous with the limb, the latter in fruit rotting away and persisting as a beak-like remnant at the summit of the fruiting spathe which is 3–6 cm. long[1]. In the problematic plant of southeastern Virginia there is a strong constriction or stoutish neck at the base of the flaring limb, this constricted portion soon deliquescing and by circumscission leaving a truncated fruiting spathe 5.5–8 cm. long. In *P. virginica* the thoroughly dried green to amber berries are 6–12 mm. long; in the southeastern Virginian plant 1–1.5 cm. long. In short, the two species are in almost every character distinct but, whereas the leaf-blade of *P. virginica* is excessively variable, that of the new species is relatively constant in outline. At one station of the latter, along a woodland creek, where Long and I were collecting the plant, a game-warden stopped his car to investigate

[1] ***Peltandra Tharpii*** **Barkley in Madroño, vii. 131, t. 21 (fig. at left) (1944) was separated as a new Texan species because of its "scapes . . . recurving; spathe green, 3.5–4 cm. long, 1.5–2.5 cm. broad, completely enveloping the spadix". As shown by his illustration, the description was based on a *fruiting* plant with the regularly recurving scape, and the lower fourth of the original spathe, the small insert showing the characteristic short beak of the fruiting spathe of *P. virginica*. The leaves, as shown in the plate and in an isotype before me, are those of *P. virginica*, forma *hastifolia* Blake in Rhodora, xiv. 105, t. 94, fig. 3 (1912).**

the obvious poaching going on within sight of the road. When we showed him the collection of white spathes with the orange-yellow spadices, suggesting miniature calla-lilies, his prompt and rather contemptuous reply was simply: "Oh! gathering water-lilies!" Nobody would think of so denominating the tight green and far from ornamental spathes of *P. virginica*.

When I described and illustrated this novel plant of south-eastern Virginia, being then completely overwhelmed by the mass of detailed study in all directions before I could satisfactorily answer the thousands of insistent queries, "How soon will the Manual be done?" (each accompanied by some such note as "I am inclosing a stamped envelope; please send me a list of all the changes you are making. I need them by the end of next week"), I tried to pass this problem over to others, writing: "If someone will volunteer to collate the material and reach a decision I shall be greatly relieved". But the boomerang returns. After eight years, having had no relief, not even a post-card on the subject, it is necessary to spend four days clearing the problem myself. Fortunately, Rafinesque's nine reputed species seem to contain nothing which can definitely be associated with the plant with white limb and golden spadix. The only one of them which might have to be considered is *P. Walteri* (Ell.) Raf. New Fl. N. Am. i. 88 (1836):

> 7. Peltandra Walteri Raf. Arum sagittifolium Walter, Arum Walteri Elliot. Leaves triangular sagittate, angles divaricate acute. In Carolina, not well described, but very near *P. latifolia*, said to be larger than *P. hastata* with similar flowers.

Rafinesque's diagnosis was surely copied directly from Elliott's ("not well described") very brief one of his *Arum* "Walteri?", based on *A. sagittifolium* sensu Walt., not L. Furthermore, Elliott was separating it from *A. virginicum*, which had "*Spathe* . . . slightly repand or undulate along the margin, closely embracing the spadix", only by the shape of the leaf, for "In the spathe and spadix I have noticed no difference". In other words, *Peltandra Walteri* was nothing but one of the many leaf-forms of *P. virginica*.

As to the identity of the basic *Arum virginicum* L. Sp. Pl. 966 (1753), the diagnosis was the briefest and most inconclusive possible:

virginicum. 13. ARUM acaule, foliis hastato-cordatis acutis: angulis obtusis. *Hort. cliff*. 434 [*i.e.* 435]. **Gron. virg*. 112.
Habitat in Virginia. ♃

Hortus Cliffortianus gives nothing more clarifying. The leaf of the *Clayton* plant, no. 228, described by Gronovius and preserved at the British Museum of Natural History, is of the typical form of *Peltandra virginica* as interpreted by Blake in Rhodora, xiv. 104 (1912), but the "pene viridi" of Clayton's account, following the Gronovian diagnosis, can have been based only on the green spathe tightly rolled around the spadix. The identity of *P. virginica* seems to be clear. I do not now hesitate to describe

Peltandra **luteospadix,** sp. nov., *P. virginicae* similis; spathae margine lacteo expanso 1–1.7 cm. lato; spadice luteo apice sterili; limbo deinde circumscissile, spatho fructifero truncato 5.5–8 cm. longo; fructibus siccatis 1–1.5 cm. longis.—*P. virginica*, southern representative, Fernald in Rhodora, xlii. 360, 430, tab. 627 (1940), where essential characters are noted. Type from bottom-land-swamp, Nottoway River, southwest of Homeville, Sussex County, Virginia, June 18, 1939, *Fernald & Long*, no. 10,179 in Herb. Gray; isotype in Herb. Phil. Acad. Other numbers from Virginia, of which duplicates were sent to various herbaria, are: Sussex Co.: Three Creek, southwest of Grizzard, no. 10,176; Jones Hole Swamp, west of Coddyshore, nos. 10,177 and 11,279; Assamoosick Swamp, northeast of Homeville, no. 10,178. Prince George Co.: Powell's Creek, Garysville, no. 8178. From farther south are the following: Booth's Bottoms, near Sandy Creek, near Athens, Georgia, *Perry, Strahan & Sublett*, no. 797. Florida, without further data, *Chapman*.

Although more clearly related to *Peltandra virginica* in its large green leaves, large and somewhat coriaceous spathe, coarse and long spadix and large green or greenish berries, *P. luteospadix* shares some characters with the southern *P. sagittifolia* (Michx.) Morong.[1] The latter, however, is a relatively small plant, with

[1] Unfortunately, through the bibliographic method of the original *Index Kewersis* and those who have followed it, this little southern species appears in Small's and other works as *Peltandra glauca* (Ell.) Feay, with the synonyms "*P. alba* Raf. *P. sagittifolia* (Mich.) Morong not Raf." To be sure, *Index Kewensis* gives under *Peltandra* the entry: "*sagittaefolia* Rafin. in Journ. Phys. lxxxix. (1819) 102 = Xanthosoma sagittaefolium"; but, had Small taken the trouble to look up the reference to Rafinesque, he would have found no such combination there made. Michaux, Fl. Bor.-Am. ii. 187 (1803) clearly described the small southern species as *Calla sagittifolia*, with no reference whatever to the wholly different *Arum sagittifolium* Walt.

small glaucous leaves and much smaller spathe, spadix and red berries. The very thin white blade of the spathe is white throughout and not nearly as long as in *P. luteospadix*, but the base of the blade is constricted or forming a neck, and the small spadix is yellow. Although it is conceivable that *P. luteospadix* arose in the far-distant past through crossing of *P. virginica* and *P. sagittifolia*, the northern limit of the latter seems to be in Onslow County, North Carolina, fully 140 miles south of the concentrated area of the constant and freely fruiting *P. luteospadix* in southeastern Virginia. In the latter region the new species flowers later than does *P. virginica* in other parts of eastern Virginia and North Carolina. The freshly flowering material of *P. luteospadix* was collected after the middle of June. The freshly flowering material of *P. virginica* from Virginia and eastern North Carolina before me shows a flowering period there beginning in late April or early May.

(see above) nor to the tropical American *Arum sagittaefolium* L. Sp. Pl. 966 (1753) which is generally considered to belong to *Xanthosoma* (I decline to sidetrack myself into untangling the nomenclature there; *Index Kewensis* gives citations for three species called by the editors *X. sagittifolium*). Ventenat in Roemer, Arch. ii[3]: 347 (1801—the title-page date, although *I. K.* says 1800), took up the genus *Caladium*, which, shortly before, he had defined in his Descr. Pl. Jard. Cels. t. 30 (1801), and on p. 351 he had a species, *C. sagittaefolium*, based on Jacquin, Hort. Bot. Vindob. (73) t. 157 (1770), Jacquin correctly calling the plant, beautifully illustrated, *Arum sagittaefolium* L. and stating that it came from tropical America. It is a *Xanthosoma*. The first reference in *Index Kewensis* under this *Caladium sagittaefolium* is "Vent. Jard. Cels. sub t. 30", followed by the correct reference for the binomial, "et in Roem. Arch.", etc. The latter reference leads directly to a discussion by Ventenat of the genus and to the binomial; but the former reference leads to the mere citation of a list of 8 species of *Arum* which, in addition to the properly combined *C. bicolor* (Ait.) Vent., constitute the genus. The binomial was not there made. Now, returning to the reputed *Peltandra sagittaefolia* or *sagittifolia* "Rafin". of *Index Kewensis* and of Small, it is clear that Rafinesque made no such combination in the place cited; it was wrongly ascribed to him by the editors of *I. K.* Rafinesque, discussing his genus *Peltandra* in Journ. Phys. lxxxix. 103 (not 102 as given by *I. K.*), simply said: "Les *Calladium sagittaefolium* et *C. virginicum* se rapportent à ce genre; mais je le base sur une nouvelle espêce *P. undulata*", which was described in some detail from "État de New-York" and is inseparable from *P. virginica* (L.) Schott & Endl. *Caladium sagittaefolium*, cited by Rafinesque, was, of course, the tropical American *Xanthosoma* and had nothing to do with *Calla sagittifolia* Michx. As I understand the nomenclature of the latter it is as follows:

PELTANDRA SAGITTIFOLIA (Michx.) Morong in Mem. Torr. Bot. Cl. v. 102 (1894), as *sagittaefolia*. *Calla sagittifolia* Michx. Fl. Bor.-Am. ii. 187 (1803). *Arum sagittifolium* (Michx.) Pursh. Fl. Am. Sept. 299 (1814), not *A. sagittaefolium* L. *Caladium sagittifolium?* Nutt. Gen. ii. 222 (1818), not *C. sagittaefolium* (L.) Vent. *Caladium glaucum* ? Ell. Sk. ii. 631 (1824). *P. alba* Raf. New Fl. N. Am. i. 88 (1836). *Xanthosoma sagittifolium* sensu Chapm. Fl. So. U. S. 441 (1860), not Schott. *P. glauca* (Ell.) Feay ex Wood, Class-bk. 669 (1861).

A HYBRID BETWEEN SHAGBARK AND BITTERNUT HICKORY IN SOUTHEASTERN VERMONT

Wayne E. Manning

In the fall of 1944, while searching for sweet pignut south of Brattleboro, Vermont, I found a large tree whose 4-valved fruit looked like *Carya ovalis*. The bud-scales of one of four small trees at the base of the large one were, however, valvate as in *C. cordiformis*, but brown as in *C. ovalis*. This group of trees appears to be the hybrid × C. Laneyi Sarg. var. chateaugayensis Sarg. between *C. cordiformis* and *C. ovata*, though it is very close to × *C. Demareei* Palmer (Journ. Arn. Arb. **18:** 135–136, 1937), a hybrid between *C. ovalis* and *C. cordiformis*.

Collections have been made of fall condition, fruit, winter buds, opening buds, and early summer condition of the trees; a specimen has been deposited at the Arnold Arboretum.

The trees are growing on a rocky wooded hillside 60 feet above state road number 30 on its western side, 7 miles north of the Mass.-Vermont line, and 2 miles north of the dam at Vernon, Vermont. A large tree of characteristic *C. cordiformis* is growing 50 feet north of the hybrid, and a fallen one is close to the hybrid. A small tree of *C. ovata* is located about 300 ft. further north. No tree of *C. ovalis* was observed near by, but a thorough search has not been made; furthermore, many of the original trees have been removed by hurricane, fire, and cutting. Pignuts, probably *C. ovalis*, have been reported growing along the Connecticut River in Vermont as far north as Bellows Falls.

The central tree of the cluster is large, about 60 feet high, with rather flattened lower trunk, 12 inches diameter one way, 16 the other, this trunk forking 10 feet above the ground into two large trunks. The first horizontal branches are 20 feet above the ground. The bark of most of the upper part of the trunk is light gray and smooth; on the lower part it is slightly roughened with shallow diamond-shaped areas as in young trees of *Fraxinus americana* or in *C. cordiformis*. The four small trees around the larger one are probably root suckers from the main tree; the root of one of the former is clearly connected with a strong root of the larger tree.

The leaflets are usually 7 in number, occasionally 5, narrow, without tufts of hairs on the serrations such as those that occur

in *C. ovata*, essentially glabrous; small clusters of hairs occur frequently in the axils of the side veins on the lower surface, and scattered solitary hairs occur on some strong side veins. The terminal buds are much larger than the lateral ones, being about 9–12 mm. long, ovate-lanceolate, with a long drawn out point much as in *C. cordiformis;* this tip is frequently curved. The consistency and general shape of the outermost bud-scales still remaining by late August are much the same as in the bitternut hickory, but greenish brown in color, ovate-lanceolate, rather thick, barely acute, longer than the inner scales; one or both outer scales may fall off by November, exposing the finely grayish hairy inner scales. The outermost brown hardened bud-scales with narrow hairy tips found in *C. ovata* and *C. ovalis* are absent. There is a total of about six bud-scales; both inner and outer ones have few to several scattered yellow glands. The lateral buds are small, tight, greenish to yellowish brown, becoming shining chestnut brown, quite different in appearance from either *C. cordiformis* or *C. ovalis*. The bud-scales are valvate, coriaceous, the two exposed ones meeting along a line in front and back, frequently with a raised ridge at the junction of the bud-scales along the back of the bud. The bud-scales have several to many yellow glands on the surface, but the general color is not yellow. On some twigs in certain years when the terminal bud is absent because of development of flowers, the buds all seem small and chestnut brown, and the buds resemble those of × *C. Demareei*. Opening lateral buds (in a pseudoterminal position) show usually two pairs of bud-scales, the outer ones persistent, remaining small and brown, the inner ones somewhat accrescent, becoming comparatively short, broad, rather thin, obtuse, green (up to 17–20 mm. × 4–7 mm.). The bud-scale scars, on branches developed from lateral buds, show two sets of opposite, comparatively high, essentially glabrous scars much as in *C. cordiformis*. Opening terminal buds were not observed; few terminal buds seemed to mature during the season of 1944, at least on the branches seen by the writer. Bud-scale scars on branches developed from terminal buds show about six scars, rather close, but each scar is distinct, comparatively high, much as in *C. cordiformis*, and not forming a ring of much crowded narrow indefinite lines as in *C. ovata*. The fruit is medium, 4-valved almost to the base, the valves rather thin, 1–1½ mm. thick,

rough, warty, somewhat wing-margined. The nut is rather ovate, flattened, not ridged or slightly ridged to near the base, rather truncate at base with a central depression, drawn out at the apex as in *C. cordiformis*, the shell somewhat thicker than that of this species (1 mm.) with a small cavity in each of the four dorsal internal ridges. The meat is corrugated as in that of *C. cordiformis*, and presumably bitter. This is to be expected, with a tree of *C. cordiformis* near by.

In the sweet pignut the outer bud-scale of the lateral buds is sac-like, probably formed by the fusion of two lateral scales, usually shorter than the bud, open in front or often at the top exposing the inner grayish tomentose scales; there are 3 or more "pairs" of scales, the outer persistent, the inner accrescent, becoming long, broad, thin, green. In the shagbark the lateral buds may be similar to those described for the pignut, or the inner bud-scales may be exposed, the outer bud-scales being much shorter than the bud; the bud-scales are strongly accrescent, becoming large, prominent and petaloid. In both the sweet pignut and the shagbark the nut lacks cavities in the shell or the outer parts of the partitions. In *C. cordiformis* there is usually only one pair of exposed yellow bud-scales, the bud-scales becoming in the spring rather elongate, narrow, recurved; the cross section of the nut shows a large dark brown cavity in each of the four dorsal internal ridges.

Thus the general aspect of the hybrid in spring and summer is that of *C. cordiformis*, with its smooth bark and 7 narrow leaflets, but the buds are not yellow. In the fall and winter the color of the buds and the roughness and dehiscence of the fruit resemble these features in *C. ovalis*, but the bud-scales are valvate, and the terminal buds are slender and long-pointed. In size the buds resemble those of *C. ovata*. The opening lateral buds are intermediate between the conditions in *C. ovata* or *C. ovalis* and *C. cordiformis*, but are nearer to those of the last species.

Previous collections of × *C. Laneyi* and its variety *chateaugayensis*, as represented at the Arnold Arboretum, are from Summertown, Ontario; Chateauguay, Quebec; Rochester, N. Y; Lancaster, Pa.; Millerstown, Pa.

Bucknell University,
Lewisburg, Pennsylvania

A NEW SPECIES OF EUPHORBIA FROM OKLAHOMA

U. T. Waterfall

While botanizing the Waynoka sand dunes in northwestern Oklahoma the author recently collected a prostrate *Euphorbia* unlike any species with which he was familiar. It is evidently in the subgenus *Chamaesyce* as defined by Wheeler, but is like none of the species included in his monograph[1]. It seems to be a quite distinct species characterized by its large glabrous angular fruits, long smooth roundish seeds with large caruncles, and its dimorphic involucres.

Euphorbia carunculata sp. nov. Planta annua, glabra, decumbens, ramosa; foliis oppositis, laminis integris, elliptico-ovatis (ca. 1.3 cm. longis et 0.6–0.8 mm. latis) vel oblongo-spatulatis et minoribus, petiolis 3–6 mm. longis; stipulis lanceolatis vel lineari-lanceolatis, integris vel 2–3-partitis, segmentis linearibus vel lineari-subulatis; involucris dimorphis: (1) involucris cylindro-obconicis (ca. 3 mm. longis, 0.8 mm. latis ad basin et 1.0–1.2 mm. ad apices), lobis fimbriato-ciliatis, glandulis 4, ca. 3 mm. latis, exappendiculatis, antheris abortivis; (2) involucris hemisphaericis vel hemisphaerico-campanulatis; lobis fimbriato-ciliatis; glandulis 4, stipitatis, appendiculatis; glandulis cum appendiculis 1.3–1.5 mm. longis, 0.8–1.5 mm. latis; appendiculis albis, ca. 1 mm. longis; staminibus fertilibus; capsulis glabris angularibus, 5–6 mm. longis, 4–5 mm. latis; stylis 0.5–0.6 mm. longis, bilobis, lobis ca. 0.2 mm. longis; seminibus non-angularibus, laevibus, 3.8–4.5 mm. longis, ca. 2 mm. latis, carunculis attenuatis, 0.5 mm. vel 0.8 mm. longis.

Euphorbia carunculata n. sp. Plant annual, decumbent; stems branched, glabrous, somewhat succulent, enlarged at the nodes; leaves opposite, blades entire, slightly inequilateral, the larger ones 1.1–1.4 cm. long and 0.6–0.8 cm. broad on petioles 3 to 6 mm. long; upper leaves reduced and relatively elongated becoming spatulate or rhombic-spatulate; stipules lanceolate to linear-lanceolate, usually 2- to 3-parted, divisions sometimes linear-subulate, tardily deciduous; involucres dimorphic: (1) involucres cylindric-campanulate, about 3 mm. long, 0.8 mm. wide at the base to 1.0 or 1.2 mm. wide at the top, glabrous outside and pubescent inside, margins of the lobes ciliate-pubescent; glands small, 0.2–0.3 mm. in diameter, without petaloid appendages; stamens few, abortive; stamineal bracts distinct, branching, involucre mostly filled with the fleshy gynophore; (2) involucres

[1] Wheeler, L. C. *Euphorbia Subgenus Chamaesyce in Canada and the United States.* Rhodora **43:** 97–154, 168–205, 223–286. 1941.

hemispherical to hemispherical-campanulate, lobes fimbriate-ciliate on the margins; glands 4, stipitate, appendaged; glands and petaloid appendages 1.3–1.5 mm. long and 0.8–1.5 mm. wide, appendages usually constituting from ⅔ to ¾ of the total dimensions, appendages yellowish-white; stamens fertile; stamineal bractlets divided near the summit, pubescent; fruit glabrous, angular, large (5–6 mm. long and 4–5 mm. broad), widest a little above the base and tapering to the blunt apex which may approach 2 mm. in width, reflexed when mature, gynophore glabrous; seeds 3.8–4.5 mm. long, ca. 2 mm. broad near the distal end, gradually tapering through about three-fourths of their length, then more abruptly tapering and attenuate into a caruncle 0.5–0.8 mm. long; seed flattened, but non-angular and with a smooth seed-coat.—Type: *Waterfall* and *Goodman's* 4519 from drifting sand, north of the Cimarron River, near Highway no. 281 on the Waynoka sand dunes, Woods County, Oklahoma, Oct. 11, 1947. Type deposited in the Bebb Herbarium of the University of Oklahoma. Isotypes are in the Gray Herbarium, and in the herbaria of the New York Botanical Garden and the Missouri Botanical Garden.

Associates of *Euphorbia carunculata* include: *Reverchonia arenaria*, *Oenothera latifolia* and *Heliotropium convolvulaceum*. Where the sand dunes are more stabilized *Calamovilfa gigantea* is common, it being the principal stabilizer. Associated with this stage, or its transition to higher stages, we found *Lygodesmia rostrata* abundant, at least locally. *Calamovilfa* gives way to such climax species as *Andropogon scoparius*, *A. Hallii* and *Artemisia filifolia* on the more stabilized dunes.

Department of Plant Sciences
University of Oklahoma,
Norman, Oklahoma

A DANGEROUS WEEDY POLYGONUM IN PENNSYLVANIA

Edwin T. Moul

In the late summer of 1946 a specimen of a strange *Polygonum* for Pennsylvania was sent for identification to Dr. John M. Fogg, Jr. at the University of Pennsylvania Herbarium. It was found growing in a neglected nursery belonging to Mr. Joseph B. Gable at Stewartstown, York County, Pennsylvania, where it had become a most troublesome weed.

It has been identified as *Polygonum perfoliatum* L., a native of India, China, Manchuria, Korea, Formosa, Japan and the Philippines. The identity has been checked with specimens at the Academy of Natural Sciences of Philadelphia and specimens at the Gray Herbarium at Harvard University.

The plant made its first appearance in the nursery about ten years ago, when some holly seeds sent from Japan were planted and it came up with the holly. The owner of the nursery became interested in the plant and allowed it to grow. Later in the season, when it produced brilliant china-blue berry-like "fruit," he became more interested in it for its beauty and allowed it to reproduce itself the next year. Since then it has vigorously spread from its original place until it now covers much of the area between the trees in the orchard, the edges of the lanes and the spaces between the nursery rows. Where it has become established it maintains an almost pure stand, choking all other herbaceous plants.

This *Polygonum* belongs to the *Echinocaulon* group. It is a long trailing vine growing to a maximum length of 10 to 12 feet. It forms a dense tangled mat over the ground or climbs into the lower branches of any available tree. The cover thus formed kills all herbaceous plants over which it trails. Thick mats of *Lonicera japonica* Thunb. were completely dead under the tangle of *Polygonum*. *Sambucus canadensis* L. and species of *Rubus* were overgrown and killed by the competition. The tangle in the lower branches of apple trees was thick enough to cover the leaves and cause some defoliation. It seems obvious that the leaves of the *Polygonum* are the chief factor in this struggle for existence as the roots are few in number, fibrous, weak and do not penetrate the soil very deeply.

The stem of the plant is weak, but wiry and covered with recurved spines about 3 mm. long. It is difficult to collect a proper specimen due to the manner in which the stems intertwine and hook themselves together. The leaves are deltoid, placed alternately on the stem and becoming smaller toward the apex of the plant. At each node is a perfoliate cordate stipule varying from 1 cm. to 2 cm. in diameter.

The flowers are in small capitate heads. The flower-color is usually pink, although there is a wide variation in the intensity

of the color. When the achenes are mature, the calyces turn a bright china-blue in color and make a very attractive cluster against the yellowing foliage of the plant in autumn. The achenes are large, measuring 4 mm., globose and shiny black in color. They are shed quite readily when the plant is touched and many of them had germinated and new plants had started to grow in October of 1946 when I visited the nursery. Mr. Jack Swartley, who showed me around, stated that these new plants would be killed by the frost, but some seeds would winter over in the litter and germinate next spring.

Realizing that this plant had become a serious pest, Mr. Gable tried to eradicate it by using a commerical weed killer, 2-4D, but it proved ineffective. The concentration used is not known. The Japanese beetle (*Popillia japonica*) does more damage to the weed during the time of its active above-ground feeding than the weed killer, but after the peak of beetle infestation has passed the plants recover rapidly and continue to grow and reproduce through the mild weather of autumn until late October or early November.

To date, the *Polygonum* has spread to only two neighboring farms. Vigorous and prompt action should be taken to eradicate it while it is confined to this small area, lest it become a worse pest than Japanese honeysuckle, with no hope of ever completely wiping it out.

Inquiries addressed to most of the larger herbaria have yielded only one reference to a former collection of this plant in the United States. Dr. Joseph Ewan of the U. S. D. A. Plant Industry Station in Beltsville, Maryland, writes that "*Polygonum perfoliatum* did appear at the Glenn Dale Introduction Garden, Maryland, at a site where *Meliosa* seed from Nanking, China, had been planted. The *Meliosa* failed to grow but the *Polygonum* appeared; this now comprises W. Cowgill, Feb. 15, 1937, and March 5, 1937, but was evidently eradicated by the usual weeding activities and did not persist at this location."

Specimens of the plant are deposited at the University of Pennsylvania Herbarium.

Botany Department,
University of Pennsylvania

A LIST OF FRESHWATER ALGAE FROM NEW BRUNSWICK

Herbert Habeeb and Francis Drouet

That very little has been done with the freshwater algae of New Brunswick is common knowledge. Accordingly, while home on vacation, one of the authors managed to make a fairly representative collection of freshwater algae from the vicinity of Grand Falls, New Brunswick. The collections were made during the period extending from the latter part of June to mid-August, 1947—all within an easy walking distance of Grand Falls. The collection numbers listed below are those of Herbert Habeeb. On several occasions Herbert Habeeb was accompanied in the field by the Grand Falls High School Principal, Mr. John Caldwell, an ardent student of the microscope.

The determinations were all made by Francis Drouet. The absence of such genera as Mougeotia and Oedogonium from the list does not indicate that they are absent from the local flora, but that they were not found in fruit or ripe fruit—and hence were indeterminable. The diatom, desmid, and Chara specimens remain to be determined, and it is hoped that they will be included in a future list of additional species.

Complete sets of the specimens are in the possession of the Cryptogamic Herbarium, Chicago Natural History Museum, and in the herbarium of Herbert Habeeb at Grand Falls.

Anacystis rupestris (Lyngb.) Dr. & Daily. Collection Numbers: 10063. 10206 in part. Habitats: Wet ground, brookside. Amidst moss on canyon wall.

Anabaena inaequalis B. & F. 10081. Dried-up water course in a pasture with sterile *Oedogonium*.

Amphithrix janthina B. & F. 10159 in part. 10310 in part. Scraped off boulder in stream, and off wet ledge.

Apiocystis Brauniana Näg. 10305. With sterile *Oedogonium* sp. in a rock-ledge pool.

Batrachospermum moniliforme Roth. 10028. 10036. Anchored in cool moving water.

Botrydium granulatum (L.) Grev. 10161 in part. 10182. 10186 in part. Baseball diamond. Damp mud of road rut.

Calothrix juliana B. & F. 10034. Crust covering clinkers in brook.

Calothrix parietina B. & F. 10033 in part. 10143 in part. 10145 in part. 10152. 10302. On rocks in brook. Covering usually xerophytic ground. On bottom of dry rock-ledge pool.

Chamaesiphon polonicus (Rostaf.) Hansg. 10159 in part. Scraped off boulder in stream.

Chaetophora elegans (Roth) Ag. 10024. Gelatinous spots on rocks in brooklet.

Chlorococcum humicola (Kütz.) Rabenh. 10127. On dead wood in shade.

Chlorotylium cataractarum Kütz. 10033 in part. 10153 in part. 10222. Crust on rocks in brooklets.

Cladophora crispata (Roth) Kütz. 10050. 10061. 10151. 10183 in part. 10209. 10213. 10308. 10313 in part. Amidst stones and rocks in shallow parts of brooklets. Attached to sides of rock-ledge pools.

Cladophora glomerata (L.) Kütz. 10270. Attached to ledge in a rapid-flowing streamlet.

Cylindrospermum licheniforme B. & F. 10118. 10124. On ground. Shaded lawn.

Cylindrospermum majus B. & F. 10170. On damp mud in a swamp.

Cylindrospermum muscicola B. & F. 10298. On damp lawn.

Dichothrix Baueriana B. & F. 10261. Wet ledge at edge of rock pool.

Dichothrix gypsophila B. & F. 10148 in part. 10149. 10265 in part. 10267 in part. In trickling water on wet ledges.

Draparnaldia plumosa (Vauch.) Ag. 10037. 10134. 10225 in part. On rocks in moving water. In a water barrel at a spring.

Fischerella ambigua (B. & F.) Gom. 10162. Exposed soil of ball diamond.

Gloeocapsa alpicola (Lyngb.) Born. 10057. 10283. 10314 in part. On blackish-colored wet to damp ledges, in shade.

Gloeocapsa membranina (Menegh.) Drouet & W. A. Daily, **comb. nov.** *Pleurococcus membraninus* Menegh.,[1] Mem. R. Accad. Torino, ser. 2, **5** (Sci. Fis. e Math.): 34. 1843. *Protococcus membraninus* Menegh. in Kütz., Tab. Phyc. **1:** 5. 1846. *P. rufescens* Kütz., ibid. p. 9. 1846. *Pleurococcus rufescens* Bréb. in Kütz., loc. cit. 1846. *Chroococcus membraninus* Näg., Gatt.

[1] Duplicate specimens of the original material of this species collected by Meneghini in the Euganean springs at Abano near Padova were studied in the collections of the Rijksherbarium at Leiden, the Naturhistoriska Riksmuseet at Stockholm, and the Herbarium of the University of California at Berkeley. They contain the same species as treated by Daily in Amer. Midl. Nat. **27**: 642 (1942) and by Drouet & Daily in Field Mus. Bot. Ser. **20**: 148, footnote 2 (1943) under the name *Chroococcus rufescens* (Kütz.) Näg.—F. Drouet and W. A. Daily.

einz. Alg., p. 46. 1849. *C. rufescens* Näg., loc. cit. 1849. COLLECTION NUMBER: 10264 in part. In trickling water on ledge.

GLOEOCAPSA TURGIDA (Kütz.) Hollerb. 10208 in part. In scum on surface of shallow water, brookside.

GLOEOCYSTIS CONFLUENS (Kütz.) Richt. 10188. 10192. 10194. 10303. 10304. Surface of ledge in the shade. On usually xerophytic ground. In rock-ledge pool.

HYDROCOLEUM HOMOEOTRICHUM Gom. 10136 in part. 10256 (the phormidioid state). 10267 in part. Riverside ledge at waterline. On rocks in streams. In trickling water on ledge.

LYNGBYA OCHRACEA Gom. 10287. 10220. 10174. 10169. 10001. In cool slow water. In a swamp seepage.

MICROCOLEUS ACUTISSIMUS Gardn. 10106 in part. Sandy shore of the St. John River.

MICROCOLEUS PALUDOSUS Gom. 10104. 10105. 10106 in part. 10107. In ledge cracks and on sandy shore of the St. John River.

MICROCOLEUS VAGINATUS Gom. 10109. 10122. 10123 in part. 10132 (the phormidioid state). 10145 in part. 10164 (juvenile plants). 10167 (young plants and moss protonema). 10175. 10176. 10178 (young plants). 10185. 10190. 10228. 10275. 10297. 10299. 10321. On soil between buildings. On ground in shade. In mud puddles. In a ditch. On old roadways and in pathways. On usually xerophytic ground.

MICROSPORA STAGNORUM (Kütz.) Lagerh. 10243. With sterile *Bulbochaete* sp. and other *Algae* near the shore of a river.

MICROSPORA WITTROCKII (Wille) Lagerh. 10086. 10306. In rock-ledge pools.

NOSTOC COMMUNE B. & F. 10054. 10065 (parasitized plants). 10316 in part? Amidst moss on canyon wall. Off damp ledge.

NOSTOC MICROSCOPICUM B. & F. 10049. 10314 in part. 10317. 10319. 10322. 10324 in part. Damp canyon walls.

NOSTOC MUSCORUM B. & F.? 10325. On moss covering relatively dry ledge.

OOCYSTIS SOLITARIA Wittr. 10264 in part. 10273 in part. In trickling water on ledge. In rock-ledge pool.

OSCILLATORIA FORMOSA Gom. 10171. In water of a swamp.

OSCILLATORIA TENUIS Gom. 10113 in part. 10142 (trichomes of various diameters). 10290. 10291. 10289 in part. Covering wet mud. On bottom in cool slow water.

OSCILLATORIA TENUIS Gom. var. NATANS Gom. 10183 in part. In a rock ledge pool with other *Algae*.

PHORMIDIUM AUTUMNALE Gom. 10093. 10156. 10263. In a springlet on a rock ledge. Film on a rock in a streamlet. On a wet ledge at the edge of a rock-ledge pool.

PHORMIDIUM FAVOSUM Gom. 10232. 10249. 10253. 10255. Covering other *Algae* in slow-moving water.

Phormidium incrustatum Gom. 10153 in part. 10309. Off rocks in stream. In trickling water on a ledge.

Phormidium papyraceum Gom. 10094. Scraped off ledges at brookside.

Phormidium Setchellianum Gom. 10012. 10245. In a brown gelatinous layer on a rock in moving water. With sterile *Spirogyra* sp. in shallow water.

Phormidium tenue Gom. 10237. On *Chara* sp. in slow-moving water.

Phormidium uncinatum Gom. 10296. From shallow muddy part of a brooklet.

Plectonema Nostocorum Gom. 10051. 10064. 10206 in part. In a rock-ledge pool. In a moist limy deposit on mosses of canyon wall. Wet ground, brookside.

Plectonema purpureum Gom. 10241. On *Batrachospermum* sp. in fast moving water.

Protococcus viridis Ag. 10120. 10189. On tree trunks in the shade.

Protosiphon botryoides (Kütz.) Klebs. 10160. 10161 in part. On the exposed soil of the ball diamond.

Scenedesmus armatus (Chod.) G. M. Smith. 10273 in part. In a rock-ledge pool.

Scenedesmus dimorphus (Turp.) Kütz. 10205. On rocks in a ledge pool.

Schizothrix Friesii Gom. 10276 in part. 10277. 10281. In ledge cracks and on mosses of damp ledges.

Schizothrix Heufleri Gom. 10230. Purple coloring on a vertical sand bank.

Schizothrix lacustris Gom. 10148 in part. 10218. On a rock in a brooklet. On a ledge with trickling water.

Schizothrix Stricklandii Dr. 10131 in part. 10143 in part. 10223. Between rocks and stones in a path. On usually xerophytic ground.

Scytonema figuratum B. & F. 10196. 10272. 10323. 10314 in part? On moss of canyon wall. On damp ledge and shaded canyon wall.

Scytonema guyanense B. & F. 10320. On ground beneath an overhanging ledge.

Scytonema Hofmannii B. & F. 10067. 10324 in part. On mosses and damp canyon wall.

Scytonema Myochrous B. & F. 10066. 10150. 10265 in part. 10276 in part. In cracks and on moss of damp ledge. Scraped off damp ledge.

Scytonema ocellatum B. & F. 10328. 10131 in part. On canyon wall. Between rocks and stones in a pathway.

Sphaerella lacustris (Girod) Wittr. 10056. 10279. Coloring red the bottom and sides of a rock-ledge pool. Pink color scraped off a rock ledge.

Spirogyra porticalis (Müll.) Cleve? 10133. In shallow part of a spring.

Spirogyra varians (Hass.) Kütz. 10029. In a brooklet.

Stichococcus subtilis (Kütz.) Klerck. 10021. 10110. 10111 (various growth forms). 10112. 10128. 10157. 10163. 10186 in part. 10282. 10316 in part. On brick, concrete and bone in shade. On rock ledge in wet to dry water courses in the canyon. On damp ground, old roadway and ball diamond.

Stigeoclonium lubricum (Dillw.) Kütz. 10040 in part. 10042. 10043. 10295. Amidst rocks in shallow water. In a brooklet.

Symploca Muscorum Gom. 10055. 10117. Covering moss on damp canyon wall. On moss and grass roots at river's edge.

Tetraspora gelatinosa (Vauch.) Desv. 10087. Gelatinous masses in a spring.

Trebouxia Cladoniae (Chod.) G. M. Smith. 10181. In damp shade on ledges and base of tree trunks.

Trentepohlia aurea (L.) Martius. 10053. 10280. A rusty fuzz on shaded canyon walls.

Tribonema bombycinum (Ag.) Derb. & Sol. 10005. 10017. In slow shallow water.

Ulothrix zonata (Web. & Mohr) Kütz. 10000. 10004. 10011. 10019. 10020. 10027. 10041 in part. 10045. 10069. 10083. 10085. 10091. 10092. 10096. 10097. 10098. 10099. 10103. 10226. 10247 in part. On rocks etc. in brooks and rivers.

Urococcus insignis Berk. & Hass. 10059. Green spots on the sides of a rock-ledge pool.

Urococcus Hookerianus Berk. & Hass. 10259. Surface of a ledge below waterline.

Vaucheria geminata (Vauch.) DC. 10023. 10078. 10082. 10200. 10201 in part. 10235. 10252. In a brooklet. In the water hole of a pasture. Matted on grass in a spring. In slow shallow river water.

Vaucheria sessilis (Vauch.) DC. 10115. 10135. 10155. 10300. In slow shallow river water. On wet gravel in hillside seepage. On wet sandy ground in the shade.

Vaucheria terrestris (Vauch.) DC. 10125. 10129. On shady damp ground.

Grand Falls, New Brunswick, and the
Chicago Natural History Museum

Another New Hampshire Station for Subularia.—Inasmuch as there are few stations reported for *Subularia aquatica* L. in southern New Hampshire, and, as it seems to be near its southern limit in eastern North America in this part of the state, it appears advisable to report one more locality for the species.

Subularia aquatica L. has its southernmost known station in New Hampshire at Massabesic Lake in Auburn, Rockingham County. It occurs in southern New Hampshire also at Bradford Pond in the western part of Merrimack County and at the station herein reported 20 miles northeast of Lake Massabesic at Pleasant Pond in Deerfield, Rockingham County. In October and November 1947 when the water was very low, it was found in abundance along the sandy shore to a limited extent above the water line but more often submerged in not more than a foot of water.

Presumably, the most northerly station in the state from which *Subularia aquatica* has been reported is Franconia, though there is a "Base of White Mountains" station reported by William Oakes which is too vague to be located exactly. The known stations in the state are predominantly clustered around Lake Winnepesaukee. In addition to the aforementioned localities, collections or valid reports indicate the presence of this aquatic in the following places in New Hampshire. Grafton Co.: Holderness, Ashland; Carroll Co.: Tuftonboro, Wolfeboro, Effingham, Wakefield; Belknap Co.: Laconia, Gilmanton; Merrimack Co.: Andover.

The data on the distribution of *Subularia aquatica* were obobtained from the journal Rhodora and from the collections of the Gray Herbarium, the New England Botanical Club, and the University of New Hampshire. Specimens of the Pleasant Pond Collection, *Joanne Flint*, no. 90, are deposited in the herbarium of the University of New Hampshire.—Joanne Flint and A. R. Hodgdon, University of New Hampshire

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W. Swtitt

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Gray Herbarium of Harvard University, Cambridge 38, Mass.

Photo. B. G. Schubert

RUBUS LONGIPES: one of TYPE-SHEETS, × $\frac{2}{5}$.

Rhodora

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A SMALL GATHERING OF BLACKBERRIES

M. L. Fernald

(Plates 1093–1096)

In attempting to make a possibly usable treatment of *Rubus*, subg. *Eubatus* Focke, the Blackberries, I have succeeded in preparing a treatment of the trailing and root-tipping sections, a most difficult task in view of the very contradictory statements or illustrations in the original accounts or in discussions of the species. Nevertheless, in this rather thankless and baffling study a few plants have come to light which seem to need description or realignment. These are proposed below. It has, of course, been imperative constantly to lean on the voluminous writings on the group of the always prolific Bailey in his Gentes Herbarum. With full respect for four-score-and-ten and with the affection one feels for a student of unequaled energy, it is regrettable to find that his recent publications show too many evidences of haste and lack of careful checking. A few puzzling cases noted below show the utter perplexity into which the interpreter is led.

In their *Blackberries of New England*, Vt. Agr. Expt. Sta. Bull. 217: 78 (1920), Brainerd & Peitersen gave, as Plate XXXVI, an illustration (× 8/11) of a supposed hybrid *Rubus* with canes shown as bearing hooked prickles 2.7–3.6 mm. long; the terminal primocane-leaflet narrowly ovate and tapering gradually to a long acumination, the leaflet two thirds as broad as long; the flowering shoot prickly; the lowest pedicel (about 4.5 cm. long) subtended by a dilated and long-petioled leafy bract 3–3.4 cm.

broad; pedicels glabrous; calyx reflexed, its lobes very short-tipped and much shorter than the large (1 cm. or more thick) fruit with 20 or more plump drupelets. In Gent. Herb. vii. 306 and 307, fig. 119 (1947) the Brainerd & Peitersen plate is cited as that of the newly proposed *R. jactus* Bailey: "This plant is figured by Brainerd and Peitersen . . . in Plate xxxvi". But how completely different are the new illustration (Bailey's fig. 119) and his description: *R. jactus* with "Primocanes . . . nearly nude but bearing a very few minute prickles 1–2 [instead of stoutish and 2.7–3.6] mm. long that readily rub off", the canes, as drawn, suggesting pencils or macaroni; terminal primocane-leaflet subrotund-ovate (four-fifths as broad as long) and abruptly tipped; the flowering shoot prickleless except at summit; the glandular pedicels (up to only 3 cm. long) all illustrated as subtended by small stipule-like bracts at most 8 mm. broad (although the English text says "axillary pedicels each . . . subtended by a conspicuous broad bract, nearly or quite equalling the foliage"); calyx-lobes erect and much overtopping the tiny fruit, with conspicuous slender appendages, illustrated as nearly as long as the lanceolate blade (although the Latin description says "calycis lobi lati . . . non valde extenti"). What does one do; take into account the plate of Brainerd & Peitersen (technically it should be disregarded), follow the description, which as to several characters contradicts the seemingly accurate new figure, or follow the new illustration? Technically the type-specimen must settle the matter but when one is working against time to cover the whole vascular flora (perhaps 7000–8000 nos.) of a large area he can not take out the months necessary for careful study of types not at hand—especially with the constant dread of hundreds of other hastily published clonic species.

As the type of *Rubus flagellaris* Willd. there is shown in Gent. Herb. v. fig. 99 on p. 245 (1943) a drawing of a plant so named in the Willdenow Herbarium. This has the larger simple bracteal leaves of the inflorescence very broadly ovate to oblate or subreniform, the terminal leaflet of the primocane-leaf short-tipped and with nearly cuneate base, the pedicels forking. But as nearest matching it we are shown (fig. 100 on p. 248) a simple bracteal leaf much longer than broad and terminal primocane-leaflets long-acuminate and with rounded-cordate bases. Far-

Photo. B. G. Schubert

RUBUS LONGIPES (all FIGS. from TYPE): FIG. 1, portion of primocane and leaf, × 1; FIG. 2, short fruiting branchlet, × 1; FIG. 3, pedicel and fruiting calyx, × 10.

ther on (fig. 111) "a very distinct species in Massachusetts", *R. felix* Bailey, is shown with bracts highly suggestive of the Willdenow specimen; and surely *R. manisees ensis* Bailey, l. c. vii. 268, 269 (fig. 95) from Rhode Island is pretty close to the Willdenow specimen, as well as to the illustration of *R. felix*. Since dewberries with just such broad bracts occur from Massachusetts, Rhode Island and Connecticut to southeastern Virginia, to one who can not now settle the question the designation of two "new species" to cover them does not seem wholly felicitous.

Another reputed ally of the problematic *Rubus flagellaris* is *R. eflagellaris* Bailey, l. c. 262, 263, fig. 91 (1947), "probably to be keyed with the *flagellaris* group rather than with the glandiferous section (page 242, Gent. Herb. v) but to be mentioned in the latter". *R. eflagellaris* is shown in a very clear drawing as having 4 or 5 short and spreading-ascending "glandiferous pedicels" (descr., p. 262) 1.5–3 cm. long and diverging from a prolonged axis; while *R. flagellaris* sensu Bailey is described, l. c. v. 244 (1943) as "glandless throughout" and with "inflorescence ascendate", the almost erect glandless pedicels shown in fig. 100 as 4–6.3 cm. long. If, therefore, Bailey's groupings in his key to the *Flagellares* mean anything (and they certainly do), the newly proposed *R. eflagellaris* does not belong in his "§ I. . . . *Plant without gland-tipped hairs or long pinhead glands on* . . . *pedicels or calyx*" nor under "+*Florescence.—Inflorescence* . . . *of the simple ascendate order or reduced to a single upright pedicel.* . . . cluster lacking a continuing central rachis", this leading to his *R. flagellaris*. In other words, the "continuing central rachis" (illustrated as 5 or 6 cm. long) and the other characters shown would seem to place *R. eflagellaris* in Bailey's §II. (p. 242), "++*Florescence.—Flowers and fruits in more or less definite cymiform or racemiform clusters*, many or most of the pedicels short and flaring or divaricate . . . from the central rachis; glands only on pedicels and calyx" (p. 243) and not too far from *R. Grimesii* Bailey (discussed under the new *R. imperiorum* below) and *R. particeps* Bailey. The student who tries to visualize *R. eflagellaris* as "probably to be keyed with the *flagellaris* group rather than with the glandiferous section" is bound to go astray.

Many other such seeming contradictions form perpetual

stumbling-blocks to ready interpretation, but only three others need here be noted. *Rubus obvius* Bailey, l. c. v. 359 (fig. 159) and 360 (1943) is described with primocane-leaflets "more than one-half as broad" as long; yet the illustration shows the terminal leaflet of the uppermost expanded leaf 4 cm. long and only about 1.5 cm. broad. Does one follow the description or the illustration? In vol. v. 71 (1941) the first species keyed under "EE. Axis of primocanes conspicuously glandular-hairy" is "22. R. vigil". Nevertheless, turning to the description of *R. vigil* (p. 86) one reads: "Canes hard and woody, glandless" and the beautiful illustration (fig. 29) so shows them!

Lastly, if foliage-characters mean so much that every slight divergence in outline, number of trichomes, toothing, etc. always means a "new species", look at the original plate (not cited in Gent. Herb. v. 254) of *R. canadensis*, var. *roribaccus* Bailey in Am. Gard. xi. 642, with plate as frontispiece (1890), then look at fig. 102 in Gent. Herb. l. c. (nearly like the original plate, with the bracteal leaves or leaflets narrow and much longer than broad). Then turn over to fig. 103, also called *R. roribaccus*, with broadly cordate-ovate bracts. If these are all one species, simply modified by transplanting, are not 90% of recent propositions open to serious doubt as to their fundamental or stable characters? Perhaps not; it is more probable that the cordate-bracted plant is not *R. roribaccus*.

Rubus trifrons Blanchard, var. **pudens** (Bailey), stat. nov. *R. pudens* Bailey, Gent. Herb. v². 78, fig. 26 (1941).

The large series of *Rubus trifrons* which has been assembled in the Gray Herbarium and the herbarium of the New England Botanical Club shows typical *R. trifrons*, with the primocanes copiously bristly, to pass into *R. pudens*, in which the primocanes are essentially smooth or with only few scattered bristles. In the most typical *R. trifrons* the petioles of the primocane-leaves are rather copiously bristly, in the illustration of *R. pudens* shown as nearly bristleless. Both series show too much integradation over their broad range, but the more typical and more bristly-caned *R. trifrons* is usually coarser than var. *pudens*, the former ranging from middle Nova Scotia and southern New Brunswick to eastern Ontario, eastern New York and Connecticut, while the smoother-caned and usually more slender var.

pudens extends eastward to Cape Breton Island but, so far as the material shows, does not extend west of the Connecticut Valley in Vermont, with its southwestern limit on Cape Cod. *R. trifrons* (frequently 5-foliolate) varies, as do most species, in the size and outline of leaflets. The terminal primocane-leaflet may be obovate, elliptic or ovate, without any apparent constant difference in the smoothish calyx-lobes, which range from 3.5–5 mm. long, and the small petals, mostly 5–9 mm. long and 2.5–4 mm. broad. I find myself unable, therefore, to maintain *R. alter* Bailey, l. c. 82, fig. 28 and *R. harmonicus* Bailey, l. c. 86, fig. 30. All of these plants differ from *R. hispidus* Michx. in their less coriacceous and scarcely lustrous deciduous leaves, with the leaflets not so blunt and having sharper toothing. Brainerd's contention that *R. trifrons* arose through crossing of *R. hispidus* with a member of § *Setosi* was wholly reasonable. The coarser and more bristly extreme parallels typical *R. hispidus* L., the more slender and nearly smooth-caned plant simulating *R. hispidus*, var. *obovalis* (Michx.) Fernald.

Rubus (§ Flagellares) **longipes,** sp. nov. (tab. 1093 et 1094), a *R. particulare* differt primocannae aculeis unguiculatis; primocannae foliis subtus glabrescentibus quinatis; petiolo valde armato aculeis unguiculatis recurvatis; foliolis ellipticis vel elliptico-obovatis dentato-serratis acuminatis foliolo terminali 6–7 cm. longo 4 cm. lato basi sensim rotundato petiolulo glabrato 1.7–2.5 cm. longo, foliolis mediis petiolulatis petiolulo 1–1.5 cm. longo; stipulis lanceolato-linearibus 1.5–2 cm. longis; floricannis subsimplicibus remote unguiculato-aculeatis; floricannae foliis ternatis, foliolis plerumque angusto-obovatis obtusis; flore 1 bractea ternata vel simplici; pedicello recto 1.5–3.5 cm. longo divergenter villoso deinde glabrato.—Southeastern Virginia: open sandy bank near Meherrin River, south of Hugo, June 13, 1939, *Fernald & Long*, no. 10,289, distrib. as *R. Enslenii* Tratt. (type in Herb. Gray.; isotype in Herb. Phil. Acad.).

Rubus longipes belongs in the usually 1-flowered series typified by *R. Enslenii* Tratt. In the latter species and the commoner and coarser *R. Baileyanus* Britton, both frequent in eastern Virginia, the pedicels and petioles, at least of flowering material, are merely appressed-pilose or glabrescent, usually without glands. The other eastern Virginian species of the series, *R. scambens* Bailey and *R. leviculus* Bailey, have the young (usually

the mature) pedicels and petioles spreading-villous and usually with stipitate glands and their mostly 3-foliolate primocane-leaves have the paired lower leaflets subsessile, *R. scambens* common, *R. leviculus* found chiefly on bottoms or slopes of the Meherrin River system. The other two species with divergent villi on pedicels and petioles which I am able to recognize in the manual-range are *R. particularis* Bailey, Gent. Herb. vii. 291, fig. 110 (1947) and the newly proposed *R. longipes*, in both of which the primocane-leaves are mostly 5-foliolate, with the upper pair of leaflets on definite petiolules. *R. particularis* of upland West Virginia has the petioles, axes of flowering shoots and pedicels densely spreading-villous but glandless, the leaves velvety beneath, and the single flowers on pedicels only 1–1.5 cm. long. *R. longipes* (for the elongate petiolules) is promptly glabrate throughout, although the fruiting pedicels rarely retain traces of long villosity and stipitate glands; its stipules are broader and longer than indicated in the illustration of *R. particularis* and the fruiting pedicels are up to 3.5 cm. long. On the lower Meherrin it is not far from the northern extension from eastern South Carolina of the extremely slender, almost herbaceous and merely short-bristly *R. leviculus*, with which it can hardly be confused.

Rubus (§ Flagellares) **imperiorum,** sp. nov. (tab. 1095 et 1096), primocannis adscendentibus deinde prostratis angulatis glabris remote aculeatis, aculeis deltoideo-subulatis 3.5–4.5 mm. longis; primocannae foliis plerumque quinatis subtus molliter pilosis supra adpresso-pilosis; petiolo remote unguiculato-armato; foliolis caudato-acuminatis argute duplicato-dentatis, dentibus plerumque 3–5 mm. longis basin versus 3–5 mm. latis; foliolo terminali rotundato-ovato subcordato 10–11 cm. longo 7–8.5 cm. lato, petiolulo 3–3.5 cm. longo sparse piloso, foliolis mediis vix minoribus oblique ellipticis; ramulis floriferis sparse villosis subremote armatis; floricannae foliolis plerumque lobulato-dentatis dentibus obtusis 3–7 mm. longis 4–6 mm. latis, foliolo terminali et bracteis simplicibus late rhomboideis; corymbo folioso (2–) 3–8-floris; pedicellis villosis adscendentibus vel patentibus plerumque 1–3.5 cm. longis remote armatis; calycis tomentulosis inarmatis segmentis ovalibus; petalis 1.2 cm. longis 0.8 cm. latis; fructibus 1.2 cm. diametro.—Virginia: in grass at edge of pine-woods 1½ miles east of Williamsburg, April 17 (*fl.*) and June 11 (*fr.*), 1921, *E. J. Grimes*, no. 3442 (type, 4 sheets, in Herb. Gray.).

Photo. B. G. Schubert

RUBUS IMPERIORUM: portion of floricane, × 1, from TYPE.

Photo. B. G. Schubert

RUBUS IMPERIORUM (both FIGS. from TYPE): FIG. 1, portion of primocane-leaf, × 1; FIG. 2, fruiting summit, × 1.

The fine series constituting the type of *Rubus imperiorum* (of the Dominions) was identified by Bailey as *R. Baileyanus* Britton, as was the material of some other now clearly recognized species. It has little relation to *R. Baileyanus*, which belongs to the *Enslenii*-series with predominantly 1-flowered fertile branchlets, cord-like rather flexible canes, primocane-leaves glabrescent beneath, the margins sharply serrate, the terminal petiolule 0.5–2 cm. long; flower usually solitary (rarely 2 or 3) on an erect minutely puberulent to glabrous pedicel up to 7 cm. long. *R. imperiorum* is wholly different: a coarser plant with strong ligneous canes; leaves velvety beneath, with broad and coarse dentation or even rounded-lobulate; the terminal primocane-leaflet on a spreading-villous petiolule 3–3.5 cm. long; the definite corymb with mostly 3–8 flowers on arched-ascending to divergent villous pedicels at most 3.5 cm. long. In the broad and low lobulate dentation *R. imperiorum* seems unique among the species of § *Flagellares* with arcuate-ascending to divergent short pedicels and leaves subvelutinous beneath. *R. Grimesii* Bailey, which it somewhat approaches, has much narrower and sharply serrate primocane-leaflets and the pedicels bear numerous fine prickles and glands, while *R. cordifrons* Bailey, common in southeastern Virginia, although with somewhat similar primocane-foliage, has the teeth sharper and narrower, while the toothing of the floricane-leaves is small and sharp. The relationship of *R. imperiorum* is, perhaps, with *R. cordifrons*.

As *R. Grimesii* I am taking *Grimes* no. 3489, collected at the edge of pine-woods ½ mile west of Williamsburg, flowering material April 30, 1921, fruiting material and primocane collected June 18, 1921, this material being in the Gray Herbarium and clearly marked by Professor Bailey "*R. Grimesii* Bailey, n. sp., type. L. H. B.". It was from these sheets that the illustration was prepared for the original publication of the species in Gent. Herb. ii. 331, fig. 158 (1932). The later abandonment of this specified type, Grimes's own material, in Gent. Herb. v. 406 (1943), and the citation there of a specimen which Grimes never saw, "*Bailey 36* (type)", collected by Bailey 9 years after the death of Grimes, does not seem at all justified. It is comparable with other shifts and contradictions which can only

perplex those who try to interpret the most active student of a group already sufficiently involved: *R. depavitus* Gent. Herb. v. 382, fig. 172 (1943) published with a beautiful plate showing a 5-foliolate primocane-leaf and glandular pedicels ("pedicelli longi, erecti, glandulosi"), but in vol. vii. 303, fig. 117 (1947) this species, *R. depavitus*, shown with 3 leaflets and glabrous pedicels, while the original plate, published as typical of *R. depavitus*, now appears as representing a new species with a highly suggestive name, *R. redundans*, l. c. 300, 302, fig. 116 (1947). Again, as "contrasted with *R. particeps* of Nova Scotia" there is presented "a picture of *R. alius*, Fig. 121" in Gent. Herb. vii. 308, 310, fig. 121 (1947), "a clear-cut species of Connecticut and Rhode Island", but the caption under the illustration calls it a "trailer in Nova Scotia". Checking back to the original account of *R. alius* in Gent. Herb. v. 400 (1943) one reads that it grows in "Massachusetts, Connecticut". It may be found in Rhode Island, but what about Nova Scotia, which in one item is indicated as its exclusive area? All of which suggests that, if one is to propose a "new species" for every clone, it would be safer not to cite two collections and to be sure that the illustrations are made from the actual types.

Rubus cordifrons Bailey, forma **pleniflorus,** f. nov., petalis numerosis, flore pleno.—New Jersey: border of dry sandy thicket, 1 mile northeast of Fairview, Gloucester County, June 14, 1924, *Bayard Long*, no. 30,768 (type in Herb. Phil. Acad.).

A beautiful and profusely floriferous double-flowered form, many of the stamens altered to petals, the flowers thus suggesting double-flowered small roses.

A STUDY OF ELYMUS IN MINNESOTA[1]

L. E. Booher and R. M. Tryon, Jr.

A preliminary study of *Elymus* in Minnesota revealed that the present treatments were not entirely satisfactory for our material and therefore a more extended study was undertaken. The present study has, of course, its limitations and problems are raised

[1] Contribution from the Herbarium of the University of Minnesota IX. Field work was supported, in part, by a grant-in-aid from the Graduate School of the University of Minnesota.

that only a monographic study can answer. In general, previous work has been accepted whenever possible to do so.

In measurements of the lengths of the spikes, glumes and lemmas awns, if present, were included unless otherwise stated. Detailed descriptions and measurements of floral parts apply to those taken from near the middle of the spike. The widths of glumes are given at their widest portion and flattened out. Measurements for lemmas, paleas, anthers and grains refer in all cases to those of the first florets. Measurements of all floral parts are based upon boiled material. All specimens cited are in the Herbarium of the University of Minnesota.

We are indebted to Mrs. Agnes Chase, Dr. J. R. Swallen and Dr. B. G. Schubert for information concerning certain specimens and to Dr. J. B. Moyle for information concerning the alkali areas in Minnesota.

a. Lemma-awns, if present, ascending, sometimes somewhat spreading, straight or irregularly flexuous, not curved or recurved, mostly less than 2 cm. long. . . . *b.*

b. Rachis continuous at maturity, not disarticulating, each spikelet disarticulating either above or just below the glumes. . . . *c.*

c. Spikelets disarticulating below the glumes[2], glumes long-lanceolate, distinctly widened above the base, more or less twisted. . . . . *d.* (1. *E. virginicus*).

d. Awns of the glumes 3–6 mm. long; awns of the lemmas 8–16 mm. long; spikes included or exserted. . . . *e.*

e. Spikes included or barely exserted, green; upper surface of the leaves glabrate to scabrous. . 1a. *E. virginicus* (*typical*).

e. Spikes well exserted, glaucous; upper surface of the leaves villous-hirsute. . . . . 1d. *E. virginicus* var. *halophilus.*

d. Awns of the glumes absent or up to 2 mm. long; awns of the lemmas 1–2.5 mm. long; spikes mostly exserted. . . . . 1b. *E. virginicus* var. *submuticus.*

c. Spikelets disarticulating above the glumes; glumes setaceous to subsetaceous, scarcely widened above the base, straight. . . . . *f.*

f. Lemma-awns more than 15 mm. long. . . . . *g.* (2. *E. villosus*).

g. Lemmas glabrate to hispid on the lower part of the body, hispid to villous on the upper part. 2a. *E. villosus* (*typical*).

g. Lemmas glabrate to puberulent on the lower part of the body, glabrate to short-hispid on the upper part. . . . . 2b. *E. villosus* f. *arkansanus.*

f. Lemma-awns less than 2 mm. long 6. *E. cinereus* (excluded species).

b. Rachis disarticulating at maturity, at least in part; a spike-

[2] The place of articulation is easily determined in dried specimens, often even those collected in flower. When the spike or spikelet is broken apart by a teasing needle, it breaks at the same place it would normally disarticulate.

let or spikelet-pair at a node falling with a rachis joint
5. *"E. Macounii"* (*Agropyron trachycaulum* var. *typicum* × *Hordeum jubatum*).

a. Lemma-awns ascending-spreading, many in a single spike curved-divergent or recurved, especially in fruit (straight only before flowering) 1.5–4 cm. long, mostly over 2.5 cm. long. . . . *h.*

h. Glumes equal, narrowly to long-lanceolate, distinctly widened above the base, distinctly 3–6 nerved, 14–35 mm., usually 25–30 mm., long. . . . . 3. *E. canadensis.*

h. Glumes unequal, setaceous, not widened above the base, or subsetaceous or rarely narrowly lanceolate; not evidently nerved to scarcely 3-nerved
4. *E. canadensis* × *Hystrix patula.*

1. Elymus virginicus

1a. E. virginicus L. (typical). *E. striatus* Willd., not of most recent authors.—*Culms* erect; *sheaths* glabrous, commonly overlapping; *blades* flat, slightly scabrous on both surfaces and more so on the under surface and on the margins; *spikes* erect, stiff, with bristly ascending awns, often with 1 to 3 rudimentary spikelets below the inflorescence proper; *rachis-internodes* flattened, scabrous or strigose-haired along margins of upper third and with a few longer coarse hairs at the top; *spikelets* in pairs, 3- to 5-flowered (mostly 4-flowered), rigid and closely appressed against the floral axis; *glumes* stout, more or less twisted, stiff, terete and about one-half as broad at the nonstriate base as near the middle, bowed out, indurated and at maturity markedly yellowed at the base for about 2 mm., glabrous or scabrous to scabrous-hirsute on margins and nerves, with 3–5 strong nerves; awns straight and ascending, scabrous; *lemmas* rounded on the back, margins of upper half often narrowly hyaline, glabrate or scabrous to sparsely hispidulous toward the apex, glabrate below, 5-nerved near the apex, awns straight, ascending, stiff, scabrous; *paleas* blunt and ciliate at the apex and along the upper half of the strong keels at either side.

Dimensions of various organs (all measurements based on 16 specimens):

Culm-length	40–80 cm.	Glume-width	1.0–1.6 mm.
Culm-width	0.1–0.3 cm.	Lemma-length	1.5–2.4 cm.
Blade-length	13–25 cm.	Length of lemma-body	7.0–8.6 mm.
Blade-width	0.3–1.0 cm.	Palea-length	6.6–8.5 mm.
Spike-length	4.5–15.5 cm.	Grain-length	4.5–5.6 mm.
Glume-length	12–20 mm.	Grain-width	1.4–1.8 mm.

In addition to the sixteen specimens included in the above description, the Minnesota collection includes three unusually robust specimens. These three specimens are distinctive only in the size of the various parts which are from 5 to 25% larger than the corresponding organs of the other specimens.

Generally distributed in open woods, river bottoms and on river banks and lake shores.

1b. E. VIRGINICUS var. SUBMUTICUS Hooker.—Differs from the species proper in having subulate-tipped or very short-awned glumes (awns up to 2 mm. long) and lemmas (awns 1–2.5 mm. long) and in having exserted (up to 10 cm.) and/or included or barely exserted spikes. Among eight specimens collected within the state, only one specimen had included spikes exclusively; five had exserted spikes of which two had short-exerted and included spikes represented in the same specimens.

Distribution and habitat similar to that of the typical element of the species.

1c. Specimens intermediate between E. VIRGINICUS (TYPICAL) and E. VIRGINICUS var. SUBMUTICUS. *E. virginicus* f. *jejunus* Ramaley.

After careful examination of available specimens, including the type of *E. virginicus* f. *jejunus*, it is our belief that it and specimens corresponding to it are intermediates between typical *E. virginicus* and var. *submuticus*.

The following table shows the range of the critical characters:

	E. virginicus (16 specimens)	*Proposed intermediate group* (5 specimens)	*E. virginicus* var. *submuticus* (8 specimens)
Length of lemma-awns	8–16 mm.	4–12 mm.	1–2.5 mm.
Length of glume-awns	3–6 mm.	Up to 5 mm. or merely subulate-tipped.	Up to 2 mm. or merely subulate-tipped.

SPECIMENS EXAMINED: MINNESOTA: Lake Benton, August 1891, *Sheldon 1375* (TYPE of *E. virginicus* f. *jejunus*); St. Louis River, July 23, 1886, *L. H. Bailey 265;* Gooseberry Falls, Lake Co., August 31, 1930, *Rosendahl 6390;* St. Vincent, August, 1900, *Ballard 2629;* Winona Co., July to October, 1897, *Holzinger 29* (UM Herb. 264292).

1d. E. VIRGINICUS var. HALOPHILUS (Bickn.) Wiegand.—*E. halophilus* Bickn.

Since this variety of *E. virginicus* apparently is not common and has seldom been described in detail, the description of the four specimens collected in Minnesota is given here. This variety differs from the typical species in having usually more flaccid and glaucous spikes, in general shorter paleas, usually less twisted glumes with pale yellow glume-bases, and glaucous leaf-blades which are pubescent on their upper surfaces.

Culms erect and slender; *sheaths* slightly shorter than the internodes, glabrous; *blades* glaucous, scabrous, villous-hirsute above; *spikes* glaucous, sometimes slightly nodding, usually several rudimentary spikelets at the base, peduncles slender, exserted 4–15 cm.; *rachis-internodes* 4–5 mm. long, hispid-ciliate; *spikelets* in pairs 3- to 5-flowered, spreading; *glumes* lanceolate, somewhat twisted, broadened above the base, scabrous on veins and margins above the terete, indurated, slightly bowed-out, pale yellow base, with 2–5 strong nerves, awns 4–10 mm. long; *lemmas* minutely scabrous along veins near the apex, 5 veins distinct only near the apex, awns straight and scabrous; *paleas* blunt at apex, ciliate-hirsute near the apex; found in both flowering and fruiting stages in July.

Dimensions of various organs (all measurements based on 4 specimens):

Culm-length	70–90 cm.	Lemma-length	14–25 mm.
Culm-width (approx.)	0.2 cm.	Length of lemma-body	7–8.5 mm.
Blade-length	13–20 cm.	Palea-length	6–7 mm.
Blade-width	0.7–1.0 cm.	Anther-length	2.8 mm.
Spike-length	7.5–15 cm.	Grain-length	5.0–5.4 mm.
Glume-length	14–23 mm.	Grain-width	1.7–1.8 mm.
Glume-width	0.8–1.4 mm.		

This variety has not been previously reported from Minnesota. It is apparently rare and has been collected in only three localities in the southern part of the state. It probably occurs only in alkali soil. Lake Shetek is definitely an alkali lake and French Lake is probably one, being in the alkali lake and pond area. The soil around Jordan is a gray glacial till derived from the western (alkali) part of the state.

We suspect that the Minnesota plant is not genetically related to the var. *halophilus* of the East but rather represents a parallel response to similar ecological conditions. Further study may well show that it is not worthy of varietal rank.

Specimens examined: MINNESOTA: near Jordan, July, 1891, *Ballard 389* (2 sheets, somewhat intermediate with typical *E. virginicus*); Bull's Bluff, Lake Shetek, Murray Co., July 5, 1902, *Skinner 303 1/2*; shore of French Lake, Windom, Cottonwood Co., July 12, 1938, *Moyle 3142*.

2. Elymus villosus

2a. E. villosus Muhl. ex Willd. (typical). *E. striatus* of many American authors, not Willd.—*Culms* densely tufted, erect or ascending; *sheaths* glabrous except for villous hairs on the inrolled margins, lower sheaths often glaucous and densely villous;

blades flat, often glaucous, thin, scabrous on the margins and on the lower surface, villous on the upper surface; *spikes* long- or short-exserted or partially included, several rudimentary spikelets at the base represented by coarse hairs, rudimentary or empty glumes; *rachis-internodes* flattened, concave above the middle next to the spikelets, slightly winged above the middle, often a blunt ridge down the length of back, hirsute on the margins; *spikelets* in pairs, usually 2-flowered (upper one sterile); *glumes* stiff, subsetaceous and tapering into their awns, usually with 3 strong nerves, terete and very slightly bowed out at the base, entirely villous or villous at the base and hirsute above, awns straight, rigid, scabrous; *lemmas* rounded on the back, villous to hispid on upper part of the body and hispid to glabrate on lower part, 5 very weak nerves visible only near the apex, awns straight, scabrous; *paleas* obtuse and ciliate near the apex, ciliate on the margins of the upper half, a few appressed soft hairs on the face.

Dimensions of various organs (measurements of floral organs based on 8 specimens):

Culm-length	40–60 cm.	Lemma-length	23–34 mm.
Culm-width (approx.)	0.15 cm.	Length of lemma-body	6–7.5 mm.
Blade-length	10–20 cm.	Palea-length	5.5–6.5 mm.
Blade-width	0.6–0.8 cm.	Anther-length	1.6–4.0 mm.
Spike-length	6–13 cm.	Grain-length	5–6 mm.
Glume-length	13–23 mm.	Grain-width	1.5–1.6 mm.
Glume-width	0.3–0.7 mm.		

This species has been collected along lake-shores and rivers and also in dry woods, meadows and on hillsides. It is generally distributed in the central and southern parts of the state.

2b. E. VILLOSUS f. ARKANSANUS (Scribn. & Ball) Fernald.—*E. arkansanus* Scribn. & Ball. This form is distinguished from the typical element of the species by the less pronounced pubescence of glumes and lemmas. It has scabrous *glumes* (nerves and margins) and sometimes in addition has a few short stiff hairs near the base; the *lemmas* are short-hispid to glabrate on upper part of the body and puberulent to glabrate on lower part. In no other morphologic feature could further distinction of the form be established. Observations are based on three specimens collected in Minnesota (*Sheldon 842*, *976 1/2* and *Moyle 2770*) and other specimens from bordering states, Iowa and North and South Dakota.

A study of a suite of out-of-state material indicates that the length and the amount of pubescence on the glumes vary independently of each other. The nature of the pubescence is consistent only in that the longest hairs are always at the apex.

3. Elymus canadensis

3. E. canadensis L. *E. philadelphicus* L.; *E. glaucifolius* Muhl. ex Willd., fragment of type in Gray Herb.; *E. canadensis* var. *pendulus* Eaton & Wright; *E. canadensis* f. *crescendus* Ramaley, type in Herb. UM, seen; *E. robustus* Scribn. & Smith, type in U. S. National Herb., isotype in Gray Herb., fragment of type seen; *E. brachystachys* Scribn. & Ball, isoparatype, *Rydberg 1174*, in Herb. UM, seen; *E. canadensis villosus* Bates, isotype in Herb. UM, seen; *E. robustus* var. *vestitus* Wiegand.

The numerous combinations based on the above basonyms have been purposely omitted.

Culms erect, tufted; *sheaths* glabrous or rarely villous; *blades* flat, long-tapering, narrowed toward the base, usually scabrous on both surfaces but less markedly so on the upper surface; *spikes* long- or short-exserted or sometimes partially included, definitely arching to rather erect, occasionally glaucous in varying degrees, often with one to several rudimentary spikelets below the inflorescence proper, the several lowest internodes of the rachis elongated with spikelets few-flowered, variable in denseness of inflorescence; *rachis internodes* slightly winged and sparsely hispid on margins above the middle; *spikelets* commonly 2 or 3 abreast, 3- to 5-flowered with uppermost floret often sterile; *glumes* occasionally glaucous in varying degrees, 3-, 5-, or 6-nerved almost to the narrowed base, nerves scabrous to hirsute, margins narrowly hyaline and microscopically serrulate; *lemmas* practically glabrate to scabrous, hispid, or villous, varying in degree from dense to very sparse, 5 nerves prominent above the middle of the body, awns scabrous and spreading, many curved or recurved especially in fruit (straight only before flowering); *paleas* blunt at the apex, ciliate-hispid at the apex and along upper margins of the keels, scattered and appressed hairs on the face.

Dimensions of various organs (measurements for floral organs based on 12 specimens):

Culm-length	70–120 cm.	Glume-length	14–35 mm.
Culm-width (approx.)	0.35–0.5 cm.	Glume-width	0.8–1.2 mm.
Blade-length	17–40 cm.	Lemma-length	32–53 mm.
Blade-width	0.5–1.5 cm.	Length of lemma-body	11–17 mm.
Spike-length	11–30 cm.	Palea-length	9.8–13 mm.
Length of rachis-internode (middle of spike)	6–7 mm.	Anther-length	3 mm.
		Grain-length	5–7 mm.
Length of rachis-internode (base of spike)	10–15 mm.	Grain-width	1.4–1.6 mm.

Material identifiable with each of the described entities cited in synonymy occurs in Minnesota. In the material we have seen,

however, the characters used to separate the entities vary considerably so that it is very difficult to draw lines of separation. In addition, no two characters correlate to any reasonable degree. About half of the Minnesota material is glaucous and the other half is green or very slightly glaucous. The spikes vary from rather erect to mostly definitely arching. Most spikes are exserted but some are included at the base. The spikes also vary from stout to slender and from long to short, without correlation between the two sets of characters. Any type of spike may be loosely or densely flowered. The sheaths and upper leaf-surfaces are rarely villous, commonly glabrous. The lemmas vary from glabrous to villous with all intermediate conditions represented; the abundance of hairs also varies greatly and without reference to their individual lengths. The variation with the villous sheaths and upper leaf-surfaces (*E. canadensis villosus* Bates) is more strongly marked than any of the others.

Taking seven pairs of the characters listed above (e. g., plant green vs. glaucous, spike erect vs. arching, etc.), there would be one hundred and twenty-eight possible combinations of characters. Of these, forty combinations occur in the fifty-eight sheets of *E. canadensis* examined.

Because of this independent behavior of the characters, we are unable to recognize any varieties within the species, and, although some variations may be worthy of the rank of form, we feel that the recognition of subspecific categories should await a broad study of all North American material.

Material very similar to ISOTYPES of *E. Wiegandii* Fernald and *E. Wiegandii* f. *calvescens* Fernald (*Fernald 197* and *Fernald & Strong in 1896*, respectively) has been collected in Minnesota: *Butters & Abbe 1024*, *E. & H. Alsapa in 1940*, and *Nielsen 1790*. We are unable to separate this material from *E. canadensis*. In their relatively narrow glumes, these specimens approach some specimens of the *E. canadensis* × *Hystrix patula* complex from which they may be separated by the equal and narrowly lanceolate glumes, rather than unequal or subsetaceous glumes.

E. canadensis is widely distributed throughout the state on lake-shores, river-banks, borders of woodlands along roadsides and railroads and elsewhere in light soils.

4. Elymus canadensis × Hystrix patula

4. E. canadensis L. × H. patula Moench. *E. diversiglumis* Scribn. & Ball, in part. *E. interruptus* of recent authors, in part, not Buckley.—*Culms* erect, rather stout; *sheaths* glabrous; *blades* flat, more or less scabrous on both surfaces, usually with scattered soft hairs on the upper surface; *spikes* loose, flexuous, mostly well exserted, usually with several rudimentary spikelets at the base, one specimen branched near the base; *rachis-internodes* slender, about 7 mm. long near the middle of the spike, much elongated near the base of the spike, narrowly winged and hirsute on margins above the middle, glabrous on the back; *spikelets* in pairs, somewhat spreading, deciduous, 3- to 5-flowered with uppermost floret usually empty; *glumes* one or more at a node, usually much reduced, spreading, scabrous to hispidulous on veins and margin, slightly bowed out and indurated at the base, setaceous to narrowly lanceolate; *lemmas* rounded on the back, hirsute to villous, 5 nerves distinct toward the apex, awns scabrous, curved; *paleas* prominently keeled at the sides, apex blunt, ciliate-hirsute along the rigid keels and at the apex, scattered and appressed hairs on the face near the apex.

Dimensions of various organs (measurements of floral organs based on 5 specimens):

Culm-length	85–125 cm.	Lemma-length	39–50 mm.
Culm-width (approx.)	0.3 cm.	Length of lemma-body	9.8–11 mm.
Blade-length	15–30 cm.	Palea-length	8.4–9.8 mm.
Blade-width	0.7–1.1 cm.	Anther-length	3.6–4.0 mm.
Spike-length	13–24 cm.	Grain-length	2.8–8.0 mm.
Glume-length	6–20 mm.	often much reduced in occasional glumes.	
Glume-width	0.3–0.4 mm.		

The following table shows the intermediate nature of the proposed hybrid:

	Elymus canadensis	×	*Hystrix patula*
Lemma-awns	Curved-divergent, usually recurved	Curved-divergent, often recurved	Usually straight, not recurved
Glumes, shape	Narrowly to long-lanceolate	Setaceous to narrowly lanceolate, mostly subsetaceous	Setaceous if present
Glumes, length	14–35 mm., usually 25–30 mm.	6–20 mm., mostly 10–15 mm.	0–18 mm., mostly less than 5 mm.
Glumes, equality	Equal or essentially so	Unequal	Very unequal
Grains	Present	Often lacking	Present

The specimens collected in Minnesota and previously referred to *E. diversiglumis* and more recently to *E. interruptus* are unique

in the variable lengths of their glumes. An unusual amount of variation is often exhibited within a single spike. An intensive study has convinced us that this material represents hybrids of the proposed parent species. Unlike recent hybrids in the *Hordeae* studied by Stebbins and co-workers[3], this one is apparently sometimes fertile, as indicated by the fact that rarely grains are developed. Such a complete series of intergrades exists between the two parents that it is likely also that there occurs considerable backcrossing of the presumed F_1 hybrids to the putative parents. The true nature of the proposed hybrid will, of course, await cytological and genetical studies.

The following selected series illustrates the transition between *Hystrix patula* and *Elymus canadensis* in the characters of the glumes: *Lakela 4183*, *H. patula*, has the glumes obsolete or rudimentary, only one of a pair developed to any size; *Sheldon 459*, *H. patula*, has the glumes obsolete to 8 mm. long with only one of a pair well developed; *Sandberg* (UM Herb. 67146), *H. patula*, has the glumes obsolete to 18 mm. long, those of a spikelet very unequal; *Bergman 2066* (N. Dakota), *Skinner & MacMillan 107*, *Ballard 578* and *Campbell 130*, *E. canadensis* × *H. patula*, have the glumes varying from obsolete to 8 mm. long and very unequal to mostly 4–15 mm. long and unequal. In all of the above specimens the glumes are setaceous. *Skinner & MacMillan 267* and *Grant 3091*, *E. canadensis* × *H. patula*, and *Rosendahl 4916* (Wis.), very close to *E. canadensis*, have the glumes subsetaceous to narrowly lanceolate, 6–20 mm. long and not very unequal; *Aiton in 1889* (UM Herb. 64790), *E. canadensis*, has the glumes equal, long-lanceolate and about 30 mm. long.

Specimens that are close to *E. canadensis* can usually be separated by their subsetaceous, relatively short glumes that are unequal in at least some of the spikelets. Those close to *Hystrix patula* can be separated by their relatively well developed glumes and the frequently recurved lemma awns.

The type specimens of *E. diversiglumis* (Wyoming) and *E. interruptus* (Texas) are from areas outside of the range of *Hystrix patula*. The status and identity of those two species is left for consideration in a broader study.

Specimens examined: NORTH DAKOTA: Walhalla, *Bergman 2066*. SOUTH DAKOTA: Big Stone City, *J. W. Moore*

[3] Stebbins, G. L., Jr., J. I. Valencia and R. M. Valencia. Artificial and Natural Hybrids in the Gramineae, Tribe *Hordeae*. I. *Elymus*, *Sitanion* and *Agropyron*. Amer. Journ. Bot. **33**: 338–351; II. *Agropyron*, *Elymus* and *Hordeum*. 579–586. 1946.

528. MINNESOTA: Crookston, *Skinner & MacMillan 107, 267;* Crystal Lake, *Ballard 578;* Rockville, *Campbell 130;* Vining, *Moore & Jacobs 14777;* Black Hoof, *Moore & Butters 13472;* Itasca Park, *Grant 2914, 3091, 3138;* Lanesboro, *Moyle 3959;* St. Anthony Park (St. Paul), *Wheeler 1224;* Itasca Park, *Rosendahl 5917, 5922;* Gull Lake, *A. P. Anderson in 1893;* Nerstrand Woods, *Linnaean Club 210;* Fort Snelling, *Nielsen 1785.* WISCONSIN: St. Croix Co. (north of Stillwater, Minn.), *Rosendahl 4916.*

This hybrid is rather widely distributed from the southeastern corner of the state to nearly the northwest corner, but has not been collected in either the southwestern or northeastern parts of Minnesota. It occurs entirely within the range of *Hystrix patula* in the state.

5. "Elymus Macounii"

5. Agropyron trachycaulum (Link) Malte var. typicum Fernald × Hordeum jubatum L. *Elymus Macounii* Vasey.

The "species" long passing as *Elymus Macounii* has recently been shown[4] to represent hybrids of various species of *Agropyron* and *Hordeum.* The material from Minnesota is all sterile, lacking grains, and it fits into such a hybrid interpretation. The parents of the Minnesota material (*Wheeler 1254, Skinner 223, Ballard 2570* and *Moyle 2609*) are proposed as *A. trachycaulum* var. *typicum* and *H. jubatum.* The critical characters of the two parents and the hybrid are presented in the following table:

Hordeum jubatum	×	*Agropyron trachycaulum var. typicum*
Rachis readily disarticulating	Rachis tardily and incompletely disarticulating	Rachis tardily and weakly, if at all, disarticulating
Spikelets in 3's	Spikelets solitary or in pairs	Spikelets solitary
Spikelets 1-flowered	Spikelets 2–4-flowered	Spikelets 3–4-flowered
Spikelets spreading	Spikelets appressed	Spikelets appressed
Glume-awns 4–8 cm. long	Glume-awns 0.5–1 cm. long	Glumes awnless or nearly so
Grains present	Grains absent	Grains present

6. Excluded Species: Elymus cinereus

6. E. cinereus Scribn. & Merr. *E. condensatus* of recent authors, in part, not Presl.

[4] Stebbins, G. L., Jr., J. I. Valencia and R. M. Valencia. Artificial and Natural Hybrids in the Gramineae, tribe *Hordeae* II. *Agropyron, Elymus* and *Hordeum.* Amer. Journ. Bot. **33**: 580. 1946.

The awnless or scarcely awned lemmas separate this species from *E. canadensis* and *E. villosus* and the setaceous or subsetaceous glumes separate it from *E. virginicus*.

This species is known to Minnesota only by a single specimen in the United States National Herbarium (Fort Snelling, Minnesota, August 3, 1890, *E. A. Mearns 4*). The identification has been confirmed by Dr. J. R. Swallen who has also kindly sent us a copy of the label. A mixture of labels may have been involved (Vasey's identification was *E. canadensis* !), but assuming not, then it seems almost certain that this species no longer grows at Fort Snelling. Local botanists have never collected the species there in spite of frequent trips to the area, even in the 1890's. Intensive development of the area during two wars has eradicated much of the original flora. Inasmuch as the Minnesota "station" is an isolated eastern occurrence, there is the possibility that it was an ephemeral adventive from the West.

Under the circumstances, we feel that it is best to exclude this species from the state flora until such a time as its occurrence may be more satisfactorily established.

Department of Botany,
University of Minnesota

DISTRIBUTIONAL NOTES AND SOME MINOR FORMS FROM OKLAHOMA

U. T. Waterfall

The following notes are concerned primarily with plants collected by the author in 1944 and 1945, mostly in south-central Oklahoma in the Arbuckle Mountains and vicinity. This area has often been botanically investigated by classes, and other parties, but has seldom been reported on as a phytogeographic area. Ernest J. Palmer spent parts of two days collecting there in 1934 while on a more extensive botanizing trip which included other parts of the state. In the Arbuckles he found and reported several species which he considered to be characteristic of the limestone areas of the Edwards Plateau in Texas. He suggested that the Arbucklean flora might constitute a northeastern

outpost of the flora of the Edwards Plateau[1]. Milton Hopkins also mentions similarities in the flora of the two regions in his discussion of the range of *Juniperus Ashei* (*J. mexicana*)[2]. Additional evidence concerning the southwestern affinities of the flora of the xeric slopes of the Arbuckles will be presented here.

The vegetation of the Arbuckle region varies from the heavily forested areas along the Washita River and some of the larger creeks (where such mesic species as *Sanicula gregaria*, *Taenidia integerrima*, *Zizia aurea* and *Dasistoma macrophylla* may be found), through mesic grassland dominated principally by *Andropogon scoparius*, to xeric slopes dominated by species listed later.

A contrast in vegetation is often found in the grassland on the north and south sides of the low limestone hills which run in a general east-west direction in the central and southern parts of the Arbuckles. The creek-bottoms and valleys between the hills are often wooded, as sometimes are the arroyos running up the hillsides. The limestone plateau which comprises the top of the Arbuckles is grass-covered, as usually are the hillsides, especially in the Arbuckle limestone. On the north sides of the hills, as on the plateau, the grassland is usually mesic in character, being composed primarily of *Andropogon scoparius* with varying amounts of *Andropogon Gerardi*, *Sorghastrum nutans* and *Panicum virgatum* growing where extra water is available, and smaller amounts of *Bouteloua curtipendula*, and other species with a lower water requirement, growing on the less favored sites. The southern slopes of the hills are often characterized by a more xeric grassland vegetation. The principal species are: *Bouteloua hirsuta*, *Bouteloua curtipendula*, *B. rigidiseta*, *Triodia elongata*, *Triodia pilosa* and *Panicum Hallii*. The latter may be fairly abundant locally. However, even on the south slopes, where faults in the rock strata, or separation of up-ended layers, have permitted the accumulation of a deep soil and the concentration of run-off water, *Andropogon scoparius* again becomes dominant. Even in the fall and winter the difference between the kinds of vegetation on the two slopes can be recognized from a distance

[1] Palmer, E. J., *Notes on some plants of Oklahoma*. Journ. Arn. Arb. **15**: 132–134. 1934.

[2] Hopkins, Milton, *Notes from the Herbarium of the University of Oklahoma*—I, Rhodora **40**: 425–429. 1938.

by the contrasting coloration. The grasses on the northern sides, predominantly *Andropogon scoparius*, cure to a brownish or red-brown color. The southern slopes are a lighter color as many of the species growing there dry to a light, yellowish or grayish color. In extreme cases it is almost as if the two sides of the hill were separated several hundred miles geographically and climatically. This seems to be due to the probability that the available water supply on these sites is critically near the minimum amount needed for the growth of *Andropogon scoparius*. Consequently, the increased evaporation on the south-facing slopes reduces the amount of available water below the minimum required for the perpetuation of *Andropogon scoparius*. More xeric species, having lower water requirements, are consequently found on these sites. This is not to be taken as precluding the probability that the distribution of certain species may be correlated primarily with the presence of limestone, or other different substrates of immature soils. Thus the xeric vegetation on limestone hills may differ from that on granite, climatic conditions being similar.

An example of several species southwestern in affinities was found growing on an igneous canyon-wall along a creek 8 miles west and 3 miles south of Davis, Murray County. Here were collected: *Cheilanthes Eatonii*, *Pellaea Wrightiana*, *Leptochloa dubia*, *Abutilon incanum* and *Galium texense*.

Some of the xeric species found on limestone include: *Triodia pilosa*, *Triodia elongata*, *Bouteloua rigidiseta*, *Panicum Hallii*, *Sida procumbens* and *Galium texense*.

SPHENOPHOLIS OBTUSATA (Michx.) Scribn., var. LOBATA (Trin.) Scribn. forma **purpurascens** (Vasey ex Rydb. and Shear) comb. et stat. nov. *Eatonia obtusata*, var. *purpurascens* Vasey ex Rydb. and Shear, U. S. Dept. of Agri., Div. of Agrostology, Bull. **5:** 30. 1897. Plants similar to *S. obtusata*, var. *lobata*, but differing primarily in having the glumes and upper parts of the lemmas colored dark purple, were found in a creek-bottom prairie, 3 miles east and 3 north of Sulphur, Murray County, on May 24, 1946. They were collected as *Waterfall* No. 6486.

Dr. Edward Palmer collected the type of var. *purpurascens*[1] "in the Indian Territory, chiefly on the False Washita, between

[1] The author is grateful to Dr. E. P. Killip, Head Curator of the Department of Botany, Smithsonian Institution, United States National Museum, Washington, D. C., for the loan of the type.

Fort Cobb and Fort Arbuckle, 1868". It is numbered 404, and designated by Vasey as *Eatonia obtusata*, var. *purpurascens*. Rydberg and Shear validated this herbarium name as "a form with purplish panicles". They also cited their numbers 252, 252½ and 2002 from Nebraska, and *Kearney* 271 from the same state, as representing var. *purpurascens*.

Since the principal differentiating characteristic seems to be the minor one of glume and lemma coloration, the author believes these plants should receive only formal designation, whether or not their occurrence proves to be sporadic throughout the entire range of the variety. It might also be noted that some of our specimens referable to var. *lobata* on the basis of having short panicles with appressed, rounded branches do not have puberulent sheaths. If the panicle characteristics, variable though they are, be accorded more taxonomic significance than the sheath characteristic, then it would appear that var. *lobata* should be considered as having sheaths varying from glabrous to pubescent. A second possibility is that plants with glabrous sheaths merely represent a merging with the typical variety.

Sphenopholis obtusata, var. pubescens (Scribn. and Merr.) Scribn. In checking the material of *Sphenopholis obtusata* from our state, there were found two sheets that agree with the characteristics of var. *pubescens* as set forth by Fernald[1], and also by Lamson-Scribner[2]. These sheets are: *Milton Hopkins* 1696, dry rocky woods . . . 9 miles northwest of Wilburton, Latimer County, May 7, 1937; *Elbert Little* 1083, Muskogee County, May 15, 1927. This variety appears to be an addition to our state flora.

Sporobolus pyramidatus (Lam.) Hitchc. This species is a rarity in the Arbuckles where it grows on saline soil, as did *Waterfall* 6074, taken from saline sand in the Secondary Wilcox Formation, about 3 miles north of Springer, Carter County. An abundant associate was *Distichlis stricta*, another indicator of salinity. The latter species is common farther west and northwest in the state.

Stipa leucotricha Trin. and Rupr. is locally abundant in the Arbuckle Mountain area and southward through the tight, limestone-derived "blacklands". It is often associated with *Buchloe dactyloides*, and, when abundant in this region, should

[1] Fernald, M. L., *Another Century of Additions to the Flora of Virginia*, Rhodora **43**: 533. 1941.

[2] Lamson-Scribner, F., *The Genus Sphenopholis*. Rhodora **8**: 143. 1906.

probably be considered as an indicator of overgrazing of about the same significance as the latter species.

LESQUERELLA OVALIFOLIA Rydb., var. ALBA Goodman. This white-flowered *Lesquerella* is locally abundant in the Arbuckles, sometimes coloring hills white in the early spring. It is usually found on thin, shallow soil on limestone hills. In near-climax condition it grows with such grasses as *Bouteloua curtipendula, Bouteloua hirsuta* and *Triodia elongata;* under overgrazing the *Lesquerella* increases in abundance, as do such species as *Triodia pilosa.*

In the spring of 1947, the var. *alba* was first collected from the Wichita Mountains (*Goodman* and *Waterfall* 5694). Previously it had been known only from the Arbuckles where it was discovered. Peculiarly enough, in the Arbuckles it has been found only on limestone, not on granite, while in the Wichitas it grows on granitic soils.

STILLINGIA TEXANA Johnston, var. **latifolia,** var. nov., a varietate typica differt foliis latioribus et crenatis.

In July 1946, the author collected from limestone soil in the Arbuckle Mountains a *Stillingia* apparently referable to *Stillingia texana* by virtue of the small fruits (ca. 7 mm. in diameter). However, the leaf-width was broader by two or three times than the leaf-width usually associated with *S. texana,* and the margins were crenate. Furthermore, the collection is considerably north of known records for the species, and thus in an area where variation might be expected.

Material of *S. texana* (including *S. sylvatica,* var. *linearifolia* Torr., *S. linearifolia* (Torr.) Small, not Wats., and *S. angustifolia* Engelm. as applied to the early Texas collections, not the Florida material) was borrowed from the Gray Herbarium of Harvard University, the herbaria of the Missouri Botanical Garden, University of Texas and Southern Methodist University.[1] A study of this material shows that *S. texana* commonly ranges from north-central Texas, as shown by numerous collections from near Dallas and Fort Worth, westward to Shakelford County (*Waterfall* 4345), then southwest to Taylor and Coke Counties. From the Fort Worth-Dallas area south and southwest to the Austin-Fredericksburg-San Antonio region the species often has been collected. Following the description of

[1] The author is indebted to the curators of the herbaria mentioned for the loan of material needed in this study.

the type Torrey[1] cites the following distribution: "Ravines on the San Pedro River and on limestone rocks higher up on the Rio Grande". It has been collected in Coahuila, Mexico: *Marsh* 80, Musquiz, Coahuila, 1935; *Wynd* and *Mueller* 225, Hacienda Mariposa, ravine near Santa Anna, June 22, 1936; *Wynd*, Hacienda San Rafael, about 10 miles southwest of Hacienda Mariposa along Sabinas Creek, Aug. 18, 1937. The labels on several collections state that the species was found on limestone soil, or limestone outcrops. The author's collections in north-central Texas, as well as the present one, are from such sites.

The relative narrowness of the leaves seems to be a fairly constant vegetative characteristic of the typical variety, STILLINGIA TEXANA Johnston, var. **typica** nom. nov. (*S. sylvatica*, var. *linearifolia* Torr., Botany of the Mexican Boundary, 201. 1859). A number of measurements indicate that the majority of the leaves are from 10 to 15 times longer than wide. Contrastingly, the leaves of var. *latifolia* are 5 to 7 times longer than wide. This leaf-width approaches that of *S. sylvatica*, var. *salicifolia*. From the latter variety *S. texana*, var. *latifolia* may be distinguished by the size of the fruits which average about 7–8 mm. in diameter and about 6–7 mm. in height in both var. *typica* and var. *latifolia*, as contrasted with a diameter of about 14–15 mm. and a height of 12–14 mm. in *S. sylvatica*, var. *salicifolia*. The expanded upper part of the gynophore averages ca. 6 mm. in width in *S. texana*, and ca. 10 mm. in width in *S. sylvatica*.

The leaf-margins of *S. texana*, var. *typica* are often serrulate, the apices of the teeth being tipped with prominent conical glands. This characteristic is somewhat variable. The teeth may become more and more rounded, and the apical glands nearer and nearer the sinuses until the margins are crenate with glands in, or approaching, the bases of the sinuses. The serrulate-glandular leaves are much more numerous on the examined specimens than the crenate-margined leaves.

The TYPE of *Stillingia texana*, var. *latifolia* is in the Bebb Herbarium of the University of Oklahoma. It is: *Waterfall* 6523, limestone hillside in the Arbuckle Mountains, 5 miles west and 2½ south of Davis, Murray County, July 15, 1946. An ISOTYPE is in the Gray Herbarium.

[1] Torrey, John. Botany of the Mexican Boundary, 201. 1859.

Sida procumbens Sw. This perennial, procumbent *Sida* of the southwest is found fairly frequently, but not in abundance, on xeric limestone sites in the Arbuckles. It is represented in our herbarium by the following, all from Murray County: *Waterfall* 6060, limestone hill, 1½ miles southeast of Big Canyon, June 20, 1945; *Waterfall* 6396, limestone near White Mound, Arbuckle Mountains. The following sheets, variously misidentified, belong here: *Ed Dale* 647, limestone hillside near Prices Falls, Aug. 15, 1942; *Becker, Kennedy* and *Waterfall* 5294, Viola limestone, Arbuckle Mountains; *Hopkins* 4765, Viola limestone, Arbuckle Mountains.

I find no record of the species in our flora, but it is possible that G. W. Stevens collected it, or had knowledge of an Oklahoma sheet. On p. 286 of his Manuscript Flora[1] he has this key:

Plant erect, annual, with fine pubescence.....1. ***Sida spinosa***
Plant decumbent or prostrate, perennial,
pubescence with spreading hairs.....2. *S.*

His species No. 2 is unnamed, but the plants at hand will readily key there.

Oenothera Spachiana T. & G. Plants referable to this species were collected as *Waterfall* 6461 from sand at the edge of post-oak—black-jack woods 4 miles west and 3 north of Sulphur, Murray County. The petals were yellow, drying to a pink color. In our herbarium are sheets from Latimer and Hughes Counties. Munz[2] lists collections from "Weoka" (Wewoka ?), Atoka and Mannsville. The present collection is from somewhat farther west than the above, and from an additional county.

Ludwigia natans Ell., var. rotundata (Griseb.) Fern. and Grisc. On Aug. 9, 1945, the author found this variety growing along a creek running through limestone hills, 1 mile east and 4 south of Hennepin, Murray County. It was collected as No. 6109. In our herbarium there are two sheets that may be referred to this variety. They are: *A. H. Vanfleet*, sin. num., muddy ditch near Rodgers, Aug. 6, 1905; and *Fred Barkley* 1447, Canadian River southwest of Norman, Cleveland County, July 13, 1937.

Fernald and Griscom[3] state that the range of var. *rotundata*

[1] Stevens, G. W. *The Flora of Oklahoma.* Unpublished MSS. Original deposited in the Widener Library of Harvard University. 1916.

[2] Munz, Philip A. *Studies in the Onagraceae X. The subgenus Kneiffia* . . . Bull. Torr. Bot. Club **64**: 289–290. 1937.

[3] Fernald, M. L. and Ludlow Griscom, *Three Days of Botanizing in Southeastern Virginia.* Rhodora **37**: 175. 1935.

includes ". . . Georgia and Florida to Texas". Munz[1] says ". . . Atlantic coast to Rocky Mountains". The first statement of range does not include our state; the latter is inclusive enough to do so. At any rate the above citation of specimens definitely includes the plant in our flora.

Centaurium Beyrichii (T. & G.) Robins., forma **albiflorum** forma nov., corollis albidis. Type: *Waterfall* 6529, limestone hillside, 2 miles east and 2 north of Sulphur, Murray County, July 21, 1946. The type is in the Bebb Herbarium of the University of Oklahoma. Isotypes are in the herbaria of Missouri Botanical Garden and the New York Botanical Garden. The typical, pink-flowered form of the species is found locally abundant on limestone slopes in the Arbuckles, but is not widely distributed. The white-flowered form is fairly abundant in the area from which it was collected.

Sabatia angularis (L.) Pursh, is occasionally found in wet soil along creeks running through prairies in the Arbuckles. The common species of our area, abundant on prairies, is *S. campestris.*

Sabatia campestris Nutt., forma albiflora D. M. Moore. The white-flowered form has previously been reported from Arkansas, the state from which it was described in 1941. It is fairly common on prairies in the Arbuckle region where it is found sporadically with the pink-flowered form.

Scutellaria Wrightii Gray, forma **alba,** forma nov., corollis albidis. Type: *Waterfall* 6455, limestone hillside in the Arbuckle Mountains, 8 miles west and 2 south of Davis, Murray County; type placed in the Bebb Herbarium of the University of Oklahoma. The white-flowered form is quite rare.

Galium texense Gray has been previously reported[2] from the Wichita Mountains in Oklahoma. *Waterfall* 6457, from igneous canyon-walls, 8 miles west and 3 south of Davis, extends the range known to us about 80 miles eastward within the state. It is another xeric species found here near its probable northeastern limit of range.

Artemisia annua L. Plants referable to this species were collected as *Waterfall* 6530 along the Washita River southwest of Daugherty, Murray County, August 5, 1946. I find no previous record of this weedy *Artemisia* within the state.

University of Oklahoma

[1] Munz, Philip A. *Studies in the Onagraceae XIII. The American Species of Ludwigia.* Bull. Torr. Bot. Club **71**: 156. 1944.

[2] Hopkins, Milton. *Notes from the Bebb Herbarium of the University of Oklahoma—II.* Rhodora **45**: 276–277. 1943.

Sida in Oklahoma.—U. T. Waterfall, in this issue of Rhodora, page 97, has identified the unnamed 2d species of *Sida* in G. W. Stevens' manuscript Flora of Oklahoma as *S. procumbens* Swartz, the first species being *S. spinosa* L. Two other species are known to occur in Oklahoma, *S. hederacea* (Dougl.) Torr. and *S. physocalyx* Gray (*S. hastata* St. Hil., 1827, non Willd., 1803).

Stemen and Myers' Oklahoma Flora[1] includes two species of the genus, *S. spinosa* and *S. hederacea*. Their illustration, fig. 286, p. 318, is taken from one first published in Gates' Wild Flowers in Kansas,[2] fig. 74, p. 169, and is entitled in both works "Round-leaved Sida", although the illustration shows a plant with obliquely ovate leaves with shallow broad irregular notches in the margins. The Kansas plant, known to me only from a collection by Hitchcock from Meade County, is very similar to the illustration, while the only Oklahoma specimen I have seen, *A. I. Ortenburger*, 10 July 1926, near Gate, Beaver County, has the more typical reniform leaves with crenate or serrate margins. Thus, the Kansas plant matches the illustration, although the name is inaccurate, while the Oklahoma plant fits the name but not the illustration.

The fourth species in the Oklahoma flora, *S. physocalyx*, is also known to me from a single collection, *G. W. Stevens* 403, 21 June 1913, roadside near Hollis, Harmon County, of which there are specimens in the Gray Herbarium and the United States National Herbarium. These bear the label name of "*S. hederacea* Torr." and are sterile. They are definitely referable to *S. physocalyx* by the presence of large fusiform woody roots and an indument on the stem, petioles and lower surfaces of the leaves composed of 4-rayed stellate hairs, the rays aligned with the axis of the particular organ, two pointed apically, the other two basally.—Ian D. Clement, Gray Herbarium.

[1] Stemen, T. R. & Myers, W. S. Oklahoma Flora. Harlow Publ. Corp., Oklahoma City, 1937.

[2] Gates, Frank C. Wild Flowers in Kansas, Report of the Kansas State Board of Agriculture for the quarter ending December 1932. State Printer, Topeka, 1933.

Rorippa: a Correction.—In Rhodora, xlii. 271 (1940) I took up for one of the common North American and Asiatic varieties of *Rorippa islandica* (Oeder) Borbas the name var. *microcarpa* (Regel) Fernald, based upon *Nasturtium palustre* DC., var. *microcarpum* Regel (1861). At that time I noted that there already existed a form of true *R. islandica: R. islandica*, forma *microcarpa*, erroneously ascribed to G. Beck by Thellung (1919) and based upon *R. palustris* β. *microcarpa* G. Beck (1892). I failed to note that by the International Rules my combination is invalid for, although Beck's varietal combination was later than Regel's, the transfer of it to formal rank under *R. islandica* by Thellung precludes the use of the same trivial for any other form or variety of the species. I am indebted to Dr. Stanley Jay Smith for directing my attention to this error. *R. islandica*, var. *microcarpa* (Regel) Fernald now, unfortunately, has to be called var. *Fernaldiana* Butters & Abbe in Rhodora, l. c. 28 (1940). The long, prostrate and repent plant, *R. islandica*, var. *microcarpa*, forma *reptabunda* Fernald in Rhodora, 1.35 (1948) stands as a form under var. *Fernaldiana*, since forms of a species retain their original epithets without regard to the varietal name with which they were first associated.—M. L. Fernald.

Rhodora Index; Request for Corrections.—A cumulative index to the first fifty volumes of Rhodora is being prepared. Any user of Rhodora who has noted errors in the indices to the various volumes will greatly aid in the enterprise by sending the corrections to the Editors.

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W. S. White

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 50. May, 1948. No. 593.

UNLISTED NEW NAMES IN ALPHONSO WOOD'S BOTANICAL PUBLICATIONS

E. D. Merrill

My attention was called to the desirability of checking the new names first published by Alphonso Wood in his various descriptive floras, commencing with his Class-Book of 1845, by noting that in 1933 the late John K. Small adopted *Anantherix connivens* Feay and *Peltandra glauca* Feay as the valid names for two accepted species. Neither name was listed in standard indices, and it was only after much search, and finally only through the assistance of Mr. E. J. Alexander, that the place of publication of these two fugitive names was located. Dr. Small, in accepting them, gave no references to the place of publication and they do not appear in any of the few papers that Feay[1] issued.

A somewhat casual examination of certain of Wood's works showed that they contained a considerable number of new binomials, for the most part not indicated as new. Accordingly, an examination of all of his works was made, all names under suspicion listed, and these were checked in Index Kewensis. By names under suspicion is meant all those followed by the name Wood as an authority; those followed by the names of minor authors such as Feay, Lapham, Coleman, Robbins, and others; and many of those where no authority was cited. In the

[1] Doctor William T. Feay was born in South Carolina in about 1803 and died at Savannah, Georgia, May 22, 1879. He is the author of a Catalogue of the Phaenogamous Plants growing within Thirty Miles of Savannah . . . Atl. Med. Jour. 3: 169–217. 1860.

course of checking these names it was noted that a considerable number of them had been listed without complete citations or with references to later places of publication. The results are in no way startling and scarcely affect the accepted nomenclature of the species characteristic of eastern North America; naturally there are certain additions to synonymy, for in general, but not always, the unlisted new names published by Wood have been overlooked by all subsequent authors. Very few of Wood's nomenclatural proposals have withstood the test of time.

A rather extraordinary situation developed because of the publishers' claims to numerous "revised and enlarged" editions of one text, the first Class-Book, and to their not indicating the somewhat revised editions of another, the second Class-Book, as new editions, the two very different works being issued concurrently following 1861. This I have attempted to clarify. Following this general discussion I have listed the new Wood binomials that have been overlooked, and corrected the entries for others. The unlisted names marked with an asterisk (*) total 73 and the corrected entries marked with a dagger (†) total 22. The surprising thing perhaps is that so many of the new Wood names were detected and listed by earlier bibliographers, because in most cases there is no indication that they were new. No attention has been given to Wood's binomials which are correctly listed in Index Kewensis; nor have I listed certain transfers of specific names which Wood credited to himself, where the record shows that the same transfers were made earlier by other authors. Wood actually published a considerable number of new varietal names, but these are beyond the scope of this paper. Very few of them have ever been considered by Wood's successors.

The first Class-Book

This was copyrighted in 1844, and the preface is dated June 22, 1844. Eggleston,[2] in his paper on Wood's botanical publications, says copyrighted in 1845 and published in 1845, that is, among the copies he examined. Asa Gray's copy, now in the library of the Gray Herbarium, bears the publication date on the

[2] **Eggleston, W. W.** The Botanical Publications of Alphonso Wood. Agr. Libr. Notes **2**: 95–100. 1927.

title page 1845, its copyright date being 1844; the Arnold Arboretum copy is the same, except that it was copyrighted in 1845. I have found no data that would indicate actual publication in 1844, and accordingly 1845 is the date used in the references in this paper. It is only the second part of the work with which taxonomists are concerned.[3]

The descriptive flora was a more or less conventional compilation, with concise descriptions of the families, genera, and species selected; about 690 genera and 1875 species are described. For a high percentage of the accepted binomials authorities are not indicated and only occasional synonyms are given. Wood explains their omission (p. 12) thus: "It is aside from the design of a work purely elementary like the present, to burden its pages with long lists of synonyms and authorities . . . In regard to authorities for specific and generic names, we quote none except where synonyms are introduced, or where we are indebted to contemporary authors of our own country." Unfortunately Wood did not consistently follow this plan, thus introducing a certain amount of confusion. The work was entirely that of the author except for the treatment of the genus *Carex* (125 species) which was contributed by Chester Dewey. The text includes the native and naturalized species that the author was willing to accept and the more commonly cultivated ones, even five species of *Citrus*, seventeen species of *Pelargonium*, and some other subtropical or subtemperate species that do not grow in the region covered except under glass. It is by no means a complete flora, the species selected for inclusion being apparently those known to the author, supplemented by others taken from various works such as the then standard Flora of North America published by Torrey and Gray (1838–43) which was completed only through the Compositae. In general the nomenclature accepted is the standard of the time. I have, however, noted two innovations in the new binomials *Rhododendron procumbens* Wood, p. 236, and *Desmodium glutinosum* Wood, p. 120; and several of Dewey's species of *Carex* were here actually published

[3] **Wood, A.**, A Class-Book of Botany, Designed for Colleges, Academies, and Other Seminaries Where the Science is Taught. In Two Parts: Part I. The Elements of Botanical Science. Part II. The Natural Orders Illustrated by a Flora of the Northern United States, Particularly of New England and New York. 1–124, *fig. 1–38*. i–ii. 1–474. 1845. Boston. Crocker & Brewster

for the first time although published elsewhere later. None of the names is indicated as new and hence they have generally been overlooked. There are certain typographical errors, but no really serious ones, such as *Dentaria lasciniata* for *D. laciniata* (p. 40), *Chrysanthemum siense* for *C. sinense* (p. 209) and others of this nature. Artificial keys to the genera are included but not keys to the species. Eggleston states:

> "Prof. Wood organized a class of botany at Kimball Union Academy but soon found himself handicapped by lack of a suitable botany. This he tried to rectify by appeals to Dr. Asa Gray and other botanists for a better botanical textbook. His appeals were in vain and Prof. Wood gradually prepared a manuscript for use in his own classroom. In 1845 he published the first 'Class-Book of Botany'. This edition of about 1500 copies was not stereotyped. It covered the New England States and New York. Much to his surprise, the edition was soon sold."

Two years later a second revised and enlarged edition was published by Messrs. Crocker & Brewster[4]. The title is practically the same as that of the first edition except that the last part of the subtitle reads "particularly of the United States North of the Capitol Lat. 38¾°." This edition was copyrighted in 1846, but published in 1847, the preface being dated April, 1847. This slightly modified title was used in all of the subsequent reprintings, the very numerous so-called "revised and enlarged editions", which by 1855 had attained the grand total of 41 (actual printings, not new editions). The range was extended to cover "that section of the United States which lies north of the Capitol, that is, of the 39th parallel, including essentially the States lying north of the Ohio river and Maryland". A footnote from this statement reads: "With some exceptions, therefore,. this Flora will answer for the adjacent states of Delaware, Maryland, Virginia, Kentucky, Missouri, and the Canadas." In preparation for this enlarged edition Wood had, in 1846, made a trip to western Indiana, returning via Harper's Ferry, Virginia; see Sullivant's pointed comment on this trip, p. 114. It includes the description of about 822 genera and 2325 species, the latter figure being perhaps two thirds of the number of species now currently recognized for the

[4] **Wood, A.** A Class-book of Botany, Designed for Colleges, Academies. and other Seminaries . . . Illustrated by a Flora of the Northern, Middle, and Western States; particularly of the United States North of the Capitol, Lat. 38¾°. Second Edition, Revised and Enlarged 1–645. *fig.* 1–38. 1847. Boston, Crocker & Brewster.

area covered. The pagination (1–645) is continuous, covering both the lessons and the descriptive flora.

This edition includes a certain number of nomenclatural innovations, the authorities for the binomials being more generally cited than in the first edition; synonyms are also more frequently listed. It is a distinct improvement over the first edition and was, up to 1847, the best simple treatment of its kind to appear in the United States. Still, like its predecessors and immediate successors, it was far from complete for the area covered, although the claim was made that: "It comprehends all the Phaenogamia, or flowering plants, with the Ferns, &c. which have hitherto been discovered and described as indigenous in these States, together with the naturalized exotics, and those which are more generally cultivated either as useful or ornamental." Wood states that with few exceptions he had adopted the nomenclature of Torrey and Gray's North American Flora and for the cultivated exotics that of De Candolle's Prodromus "regarding these, as they truly are, standard works." For the benefit of the more serious students he states: "It affords us pleasure to be able to recommend to all such as would venture beyond the first principles the full and elaborate 'Text-Book' of Dr. Asa Gray,—an American work of the highest merit."

This second edition was stereotyped, and from the original plates many thousands of copies were printed up to at least as late as 1869. and apparently (undated) even later. The statement "Second Edition Revised and Enlarged" appearing on the title page of the 1847 issue is true, but the publishers apparently adopted the policy of repeating the phrase, with modifications as to the number of the edition, in some, but not all, later issues. Thus between the years 1850 and 1855 we note the entries "Tenth Edition, Revised and Enlarged" up to the "Forty-first Edition, Revised and Enlarged"—thirty one "new editions" in five years! After 1855 the phrase "Forty-first Edition Revised and Enlarged" appeared on later printings, the latest dated issue I have seen being 1869. These were not new editions; all were printed from the original plates of the second (1847) edition without changes except that the addenda (p. 638) of 1847 with four entries was increased by 1869 to six entries. Thus it is that any copy of this work will provide the original data of 1847,

regardless of the dates given on the title pages and regardless of the number of the so-called edition.

There are many more nomenclatural innovations in the second (1847) edition than in the first one of 1845. In general new species are not indicated as such but some of the new names are followed by Wood's name, and in a very few cases the abbreviation *nov. sp.* appears. Examples are *Dicliptera americana* Wood, *Gerardia Skinneriana* Wood, *Sabbatia concinna* Wood "(*Nov. sp.*)", *Cuscuta lepidachne* Wood, *Stylisma tenellus* Wood (published earlier by Rafinesque), *Scutellaria rugosa* Wood "(*Nov. sp.*)" *Veratrum Woodii* Robbins "(Nov. sp.)" *Agrostis heterolepis* Wood, *Potamogeton obrutus* Wood, *Rumex altissimus* Wood, *Oplismenus hispidus* Wood, and *Diarrhena diandra* Wood. In addition to a certain number of new species proposed, there are some new combinations, these usually not indicated as such, an example being *Abies* "(Larix) Americana, Michx." Because of the, in general, obscure publication of new names it is not strange that some have been overlooked through the century that has elapsed since they were first proposed.

The second Class-Book

After changing publishers, some time after 1856, Messrs. Barnes & Burr, who handled Wood's later publications, paid him a bonus to enable him to make exploring trips in the South in connection with the preparation of the text of his greatly enlarged Class-Book of 1861[5].

According to Eggleston's records parts one to three, pages 1–174, comprising all but the descriptive flora, i. e., the text-book part of the volume, was copyrighted in 1860 and published in the same year. I have not seen this issue, nor did Eggleston record seeing any copy of other than the above pages. The complete text, copyrighted in 1860, was published in 1861, and the date 1861 is the one I have used in the references included in this paper.

This was an entirely new work, not a new edition of the first Class-Book, although occasionally individuals have characterized it as "[ed. 3]" and at least one as edition two. The area

[5] **Wood, A.** Class-Book of Botany, being Outlines of the Structure, Physiology, and Classification of Plants; with a Flora of the United States and Canada. i–viii. 1–832. *fig. 1–745.* 1861. New York, Barnes & Burr.

covered by the descriptive text was greatly extended, as expressed by Wood in the preface. "The limit of our Flora in this new series has been greatly extended. It now embraces the territory lying East of the Mississippi River, with the exception of the Southern Peninsula of Florida, and South of the Great Lakes and the River St. Lawrence . . . This Class-Book is, therefore, now professedly adapted to the student's use from Quebec to New Orleans and from St. Pauls to St. Augustine." Although the subtitle is "A Flora of the United States and Canada", this is too broad a claim, as vast areas in the north and south and all of the country from the great plains to the Pacific coast were not covered.

Like its predecessor this work was an eminently successful one and in great demand as a text book. It was reissued each year between 1862 and 1868 in large printings. The only change made in all of these issues was in the date appearing on the title page; all issues were printed from the original stereotype plates of 1861. Thus every issue between the above dates, as to the text, is identical with the original edition. These various printings were not called new editions as was the case in the numerous reprintings of the second edition of the first Class-Book.

In 1868 the work was somewhat revised, although, when it was copyrighted and printed in 1869, it still contained but 832 pages. For the most part it was printed from the stereotype plates of the 1861 issue. However, a very few species were added in the text with brief descriptive data, where this could be done without altering the limits of a given page, such as *Aster anomalus* Engelm., *A. mutabilis* Willd., *A. subasper* Lindl., *Boltonia decurrens* Wood, and *Lobelia Erynus* Linn. A very few species were dropped and their places taken by others, such as *Artemisia frigida* Willd. replacing *A. pontica* Linn., while *Clintonia* Douglas was eliminated and *C. elegans* Dougl. became *Lobelia Douglassii* Wood. However figures 746–784 were added to fill the blank at the end of the consideration of the Cyperaceae on page 730, and following p. 800 there were inserted five plates with three unnumbered pages of explanation of the 60 excellent figures showing details of the spikelets and inflorescences of 60 of the 71 genera of Gramineae considered. Apparently the publishers did not consider that these changes were sufficient to warrant them in

characterizing this issue as a new edition. It was copyrighted in 1869 and published in the same year. Like the issue of 1861 this was reprinted year after year from 1870 on up to at least 1877, and probably later. But in these issues no changes were made in the text, the only differences being the dates on the title pages.

In 1881 the work was again slightly revised, the size being increased from 832 to 843 pages, the increase in the number of pages being due entirely to the inclusion of the addenda. The preface to this issue includes this statement: "The present edition of the Class-Book of Botany (1880), again carefully revised, will be found to contain many changes in the text, especially in that of the Flora, together with an Addenda." However, most of the pages were printed from the original stereotype plates of the 1861 issue, with no changes; here and there the same mutilated characters of the 1861 issue are noted in the issue of 1881. A rather careful examination of the text shows not more than about 20 changes in the names of species, none of the names being new ones, so that again the claim that there were "many changes in the text" is misleading. The total number of changes is but slightly in excess of those made in the 1869 issue as compared with the original of 1861. The pagination up to p. 824 is identical with that of the 1861 and 1869 issues. Apparently when a minor change was made in the text, here and there, again great care was taken to see that such changes did not effect the original format, thus to reduce to a minimum the number of new stereotype plates that had to be made. The insertion of the addenda brought the total pagination up to 843 pages as contrasted with 832 pages in the 1861 and 1869 issues, and the addenda contain a few new names. Like the 1869 issue this one of 1881 was not indicated as a new edition. It also was reprinted from time to time, perhaps up to the first decade of the present century, although the latest date that I have seen on its title page is 1891. There are no changes in the text of these later issues other than in the date on the title page. Mr. Eggleston found no record as to when this text was withdrawn by the publishers, but it was still widely used as a textbook in the last decade of the nineteenth century.

Dr. Wood died January 4, 1881, and this is probably the

reason why, in the course of the succeeding two or three decades, the textbook became obsolete; probably the publishers, to whom it must have been a very profitable venture, were unable to secure the services of a competent botanist to revise and modernize the text; then, too, at the time the text was withdrawn, styles in textbooks of botany had changed, and the newer texts stressed the laboratory aspects and minimized the taxonomic phases of the subject, a condition that still persists. In most secondary schools botany was dropped, the place of botany and zoology being taken very largely by a diluted substitute known as biology.

Confusion as to various issues of the Class-Book

Because of the procedure adopted by the publishers in not indicating new editions as such, for the second Class-Book from 1861 on, as contrasted with the extravagant claims of the publishers of the first Class-Book (1845, 1847) as to its numerous "Revised and Enlarged" editions (as many as 41!), as discussed above, a certain amount of confusion has resulted. One suspects that most botanists who have, on occasion, consulted the Class-Book, a work that is now obsolete, did not realize that two entirely different works were involved, one commencing in 1845 and continued until after 1869; the other originally published in 1861 and re-issued year after year until about the end of the century or the early part of the present one. In the references included in this paper I have found it impossible to clarify the matter by citing hypothetical editions, as some have attempted to do, and have contented myself with listing the original work of 1845 as Class-Book, and the very considerably revised and enlarged edition of 1847, clearly indicated as "Edition Two, revised and enlarged", as ed. 2. The new Class-Book of 1861 I indicate as "ed. 1861", its slightly revised issue of 1869 as "ed. 1869", and the further revised issue of 1881 as "ed. 1881." This is somewhat cumbersome, but it is at least clear. One should keep in mind that all issues of the first Class-Book from edition two (1847) to the so-called "Forty-first Edition, Revised and Enlarged", which continued to be issued with the title-page dates given, as well as issues after 1869, not dated, were all printed from the same plates; that the various dated

issues of the entirely different Class-Book of 1861 to 1868, were also printed from the original 1861 plates without changes, as were the subsequent dated issues of the 1869 text, up to 1880, and of the 1881 text up to the time the book was withdrawn from circulation in the early part of the present century. The only changes in the interims involved were in the dates printed on the title pages. For a period of at least ten years two different texts under the same title "Class-Book of Botany" were being concurrently issued and sold by the thousands each year.

The American Botanist and Florist

Wood's third work[6] with which taxonomists are concerned was first published in 1870. This issue contains a certain number of nomenclatural innovations, the second part of the book, the descriptive flora, being the only part with which we are concerned. The new binomials are all obscurely published and some of them have been overlooked. In 1871 it was further amplified and republished, the pagination of the second part of the 1871 issue being increased to 444 pages. For the body of the text any dated issue will suffice, for all printings after 1871 are alike except for minor additions in the addenda, even the so-called "New American Botanist and Florist" of 1889.

In the original 1870 edition the treatment of the Gramineae and the Cyperaceae consists only of keys to the genera, with brief notes on four exotic species of grasses cultivated for ornamental purposes; there are no descriptions of the genera and species. In the 1871 issue its amplification to 444 pages is due to the inclusion of the genera and species of the above two families together with numerous small unnumbered text figures illustrating the essential parts of various genera in the two groups. No further changes were made, and then only in the addenda, until 1874, when *Ximenia americana* Linn. was added. This 1871 issue is not indicated as a new edition in spite of its very considerable amplification. All issues following 1870 bear the copyright date of that year. The descriptions are remarkably short and concise. As Wood states the case:

[6] **Wood, A.** The American Botanist and Florist; Including Lessons in the Structure, Life, and Growth of Plants; together with a Simple Analytical Flora, Descriptive of the Native and Cultivated Plants Growing in the Atlantic Division of the American Union. 1–172, *fig. 1–528*, 1–392, *fig. 550–560*. 1870. New York and Chicago. A. S. Barnes and Company.

"Our new Flora will be found a phenomenon of brevity. Within the space of 426 duodecimo pages [the text up to but not including the index] in fair leaded type, we have recorded and defined nearly 4,500 species—all the known Flowering and Fern-like plants, both native and cultivated (not excepting the Sedges and Grasses), growing in the Atlantic half of the country. This conciseness has been attained, not by the omission of anything necessary to the complete definition and prompt recognition of every species, but simply by *avoiding repetitions*."

This work was also apparently a successful one from the standpoint of both the publishers and the author. It was reprinted from the 1871 plates each year up to 1879, the only changes being in the dates on the title-pages, with a few additions to the addenda; printings after 1879 were not dated. In the 1875 issue, the total pagination was increased to 448, the new entries in the addenda extending from *Pachystima* Raf. to *Solanum verbascifolium* Linn. In 1877 the entries *Apium angustifolium* Wood to *Cyperus Wolfii* Wood were made; and finally in 1879 (possibly in 1878, no copy of this issue having been seen) the pagination was increased to 449, the last two additions being *Nymphaea flava* Leitner and *Shortia galacifolia* Torr. & Gray. In the addenda only two new binomials appear, *Echinacea Porteri* (A. Gray) Wood, p. 445, and *Apium angustifolium* Wood, p. 448, the first in the 1870 issue, the second in that of 1877.

The work was again copyrighted in 1889 under the title The New American Botanist and Florist . . . i–vi. 1–172, *fig. 1–532*, 1–449. *fig. 551–663*. 1889. This issue, like all of those appearing between 1871 and 1888, includes the same unnumbered text-figures in the treatment of the Cyperaceae and the Gramineae. This "new" work is indicated as a "Revised Edition", the revision and the editing being the work of Oliver A. Willis. The claim is made, p. vi. that "The **work** now, with its revision, new matter, additional illustrations, and fresh type, is substantially a **new book.**" There are no apparent changes in the descriptive flora, the old stereotype plates being used for this part of the book. The pagination and content is the same as that of the 1879 issue, no changes made even in the addenda.

How many issues of this work appeared after 1889 is not known. It was dropped from circulation by the publishers in 1915. In any case the second part of this "new" work of 1889 is exactly the same as the issues immediately preceding 1888.

It contains no important changes, no additions or subtractions, and no nomenclatural innovations. The changes alluded to in the editor's preface refer to the first part of the book, the lessons, which were radically changed.

The Flora Atlantica

In 1879 the descriptive part of the American Botanist and Florist was reprinted from the same plates as the later issues of that work, there being no changes whatever except in the title page.[7] How many issues of this work appeared is not known. It was withdrawn from circulation in 1915. With this work, manifestly issued "to sell", the taxonomists are not concerned as it is only a reprint of an earlier work under a new title.

The Object Lessons in Botany

In 1863 Wood issued a greatly abbreviated text which was manifestly based on the 1861 edition of his Class-Book. In this new work[8] he provided abbreviated descriptions of selected families and genera, supplied simple keys to families, genera, and species, and reduced all the species descriptions to a single line or at most two lines. It was not anticipated that this strictly popular work would contain new binomials; these would have been overlooked by me had not Prof. M. L. Fernald called my attention to a few which caused me to check all the entries.

The number of new names is small, mostly due to errors in transcription. Examples of typographical errors are *Lysimachia hibrida* (*hybrida*), *Physostegia virginianii* (*virginiana*), *Hypericum galeoides* (*galioides*), and *Polygonum dumitorum* (*dumetorum*). Perhaps it might have been just as well had I considered certain cases listed below as new binomials to represent merely typographical errors, examples being *Papaver Rheas* (*Rhoeas*), and *Aesculus Hippocastaneum* (*Hippocastanum*). Examples of undocumented new binomials are *Narcissus Daffodil* Wood, *Phlox Laphamii* Wood, *Sarracenia alata* Wood, and *Syringa alba* Wood.

[7] **Wood, A. Flora Atlantica. Descriptive Botany; being a Succinct Analytical Flora, Including all the Plants Growing in the United States from the Atlantic Coast to the Mississippi River. From the American Botanist and Florist. i–iv. 1–449. illus. 1879. New York, Chicago, New Orleans. A. S. Barnes and Company.**

[8] **Wood, A. Leaves and Flowers; or Object Lessons in Botany with a Flora Prepared for Beginners in Academies and Public Schools. 1–322. *fig. 1–665*. 1863. New York. Barnes and Burr; later issues by A. S. Barnes and Company.**

This strictly popular work was reissued from time to time. Mr. Eggleston records having seen the issues for 1863, 1888, and 1891 and noted that the work was withdrawn from circulation November 13, 1916. The earliest issue that is available in our libraries is that of 1867 which does not differ from that of 1872, these having been printed from the stereotype plates of the original edition of 1863. In 1877 it was somewhat amplified by the inclusion of certain additional families, genera, and species, this issue containing a total of 364 pages. In this issue there are no nomenclatural innovations. I have not seen any of the issues later than that of 1877.

Wood's other Botanical Works

The several other botanical texts published by Wood deal very largely with matters appertaining to elementary instruction in botany. Mr. Eggleston has listed these, providing pertinent data as to titles and dates of publication. As far as I have examined these works I have noted no nomenclatural innovations.

Alphonso Wood and Asa Gray

Wood himself would probably be the last to claim that he was a professional botanist. He was self-trained, and until toward the very end of his life was not associated with institutions involved in other than secondary education. No matter what the shortcomings of his various texts were, he did have the facility of preparing accurate, concise, and at the same time simple descriptions. In the American field he originated what he called analytical tables (really artificial keys), making the identification of both genera and species much simpler and easier than was the case with contemporaneous and earlier texts. It was in the field of simplification that Wood excelled. Eggleston states that between 800,000 and 1,000,000 copies of Wood's various botanical works were printed and sold. Actually in the last half of the preceding century Wood was the great rival of Asa Gray in the botanical textbook field. It was Wood's initial success in 1845 and 1847 that stimulated Gray to prepare and publish his first Manual, and this after Gray had refused to listen to Wood's plea in 1843 that he (Gray) should prepare a much needed text-book for secondary schools. When Gray

refused to do this, Wood proceeded to prepare one on his own account.

There was, not unnaturally, a considerable amount of resentment among the few professional and semi-professional botanists of the time, that a mere teacher in a secondary school, without institutional support, without access to comprehensive library facilities, and without other than his personal herbarium[9] should venture into the field of preparing a taxonomic treatment. Wood had certain advantages in that he was teaching in a secondary school, and he realized the type of text that was needed for his students; he was unquestionably an excellent teacher. He had no inhibitions regarding his ability to prepare a reasonably good, simple text, and had the courage of his convictions to undertake what he thought was needed. The success of his 1845 text was immediate, thus proving his contention that such a text was needed.

Apparently there was a more or less continuous controversy, if controversy it may be called, between the backers of Wood and those of Gray. In any case Gray's Manual, as well as other publications issued from time to time as text-books, was also an immediate success. I quote from an article prepared by Prof. Charles J. Lyon[10] of Dartmouth College:

"The following quotations indicate how he [Wood] was treated as a usurper without rights, with the writers making no allowance for or having no knowledge of Gray's original failure to help the schools below the college level.

'Well what I have predicted to you again and again is coming to pass—viz—that some scissors bookmaker would out of the T. and G. [Torrey and Gray] Flora make a fine dollar and cent operation, unless soon attended to by you. Mr. Alphonso Wood made me a long call the other day, just on his return from Indiana where he had spent 5 weeks (4 of them on his back with a fever) doing up all the Botany of the Western States with the view of adapting the 2nd edition of his book to Western schools. Now I'll give you my advice without charging you anything for it—announce and

[9] On Wood's death in 1881 his herbarium was acquired by the New York College of Pharmacy, where he had occupied the chair of Professorship of Botany during the last two years of his life. This is now the College of Pharmacy of Columbia University. The herbarium, estimated to contain about 40,000 sheets, has been little consulted since Wood's death. As this manuscript was being prepared, preliminary arrangements were being made to transfer the bulk of it to the New York Botanical Garden.

[10] **Lyon, C. J.** A 50 Edition Best Seller. Alphonso Wood, Class of 1834, Wrote Botanical Class Books That Reached a Circulation of 800,000 Copies. Dartmouth Alumni Mag. **31**: 18, 81–83. 1939. See also **Lyon, C. J.** Centennial of Wood's "Class-Book of Botany." Science II. **101**: 484–486. 1945.

have it appear in the course of the winter a Manual or School Flora . . . suppose you can't get the 1st ed. in as good shape as might be, that makes no odds, fix it right in the 2nd Ed. The main thing is to get possession of the track and give it out that you intend to keep it.' (letter from Sullivant to Gray, Sept. 20, 1846).

'I have been working evenings at a sketch of a *Northern Manual*, to run opposition to Wood, who is engaged on his second edition. I have a good plan sketched out. It seems now quite necessary to do this at once. It will yield no dividends to speak of, for it must be put so low as to drive Wood off the field, while at the same time it will cost considerable labor. But it will hold the field till in due time we are ready with a *United States Manual*.' (Gray to John Torrey, Dec. 1846).

'Wood will miss it if he stereotypes. Your book will drive him off the track, but I lament that you work so hard. It is bad for body and soul. Better take your chance when the Flora is done than make such a slave of yourself.' (Torrey to Gray, Feb. 17, 1847)." . . . . .

"In the words of the botanist M. A. Curtis, from his 1857 letter to Gray, 'Wood is taking the Southern field too. He spent a couple of days with me a fortnight since & has milked me to some extent; tho fortunately my Herbarium is not yet unpacked & I could not show him but a small part of my collection. I have been sorry, since he left, that I showed him as much as I did[11]. He will prepare a U. S. Botany, & is to get $1500 a year . . . . for—I forget how many years after publication. How is it that the most profitable Text Books are prepared by sciolists? . . . I have never seen his Class Book (he promised to send me a copy when he gets home) but I suspect he has some facility in the art of making a book'."

No attempt is here made to compare the works of the two rival authors. It was, of course, essentially the work of Torrey and Gray which made Wood's compilation possible, and Wood definitely did have the faculty of simplifying technical descriptions. His texts were eminently successful in the secondary school field in spite of Curtis's characterization of him as a sciolist—"one whose knowledge or learning is superficial; a pretender to scholarship." Were I to render an opinion it would be largely to the effect that the faults of Wood's published works are those due to an uninhibited amateur venturing into a professional field.

It is, however, fortunate that Wood did enter the publication field, for his success stimulated Asa Gray to prepare his descriptive texts in spite of his original refusal to listen to Wood's plea that he (Gray) should prepare a simplified text for secondary schools and a descriptive flora for the beginner's use. The first edition of Gray's Manual of Botany of the Northern United

[11] See the discussion of *Adiantum Curtisii* Wood, p. 117 and also that of *Arceuthobium abigenium* Wood, p. 120, the publication of both of which indicate a certain lack of professional courtesy on the part of the author.

States appeared in 1848, and during his lifetime it passed through five editions with various reprintings, with a sixth edition, by Watson and Coulter in 1890, two years after Gray's death, the entirely rewritten and rearranged seventh edition by Robinson and Fernald in 1908, and the highly critical eighth edition by Fernald now nearly ready for publication.

Wood's various works, issued in large editions over a long period of time (1845 to 1915) must have been highly profitable to the publishers, and doubtless also to the author, although I have no information as to what arrangements existed between the author and the publishers. It is known, however, that at least for a term of years Wood received a bonus of $1500.00 a year, for a time, to enable him to prepare the text of the second Class-Book and to extend the area covered south to northern Florida and west to the Mississippi River. This was first published in 1861.

Although Gray stated in 1846 that his text, when published "would yield no dividends to speak of," yet here clearly his judgement was in fault. If it had not been for the royalties paid by the publishers of Gray's series of class room texts, his Manual and other descriptive works, it might well have been that the Gray Herbarium, as we now know it, would have developed very differently if at all. Gray bequeathed his copyrights to the President and Fellows of Harvard College for the benefit of the herbarium. Following his death in 1888 most of the financial support of the institution was derived from the publishers' royalties. Actually in 1888 the total endowment of the herbarium was slightly less than $24,000.00; its present restricted endowment is about $675,000.00 which has been built up by gifts and by bequests since about 1890.

Torrey's prophecy to Gray in 1847 that "Wood will miss it if he stereotypes" also proved to be erroneous. All of the Wood volumes from 1847 were stereotyped, and from the plates of the 1847; 1861, and 1870 works, printing after printing was made year after year with a minimum of changes. There was in no case a thorough-going revision of the descriptive texts, the surmise being that the author was not permitted by the publishers to make other than minor changes here and there so as to avoid the necessity of making new plates. Thus the Wood

publications actually did becomes stereotyped in the secondary meaning of the word, for it may truthfully be said of all later printings of all the volumes involved that they were "lacking originality or individuality." Yet the merits of the original works were such that, to meet the constant demands, all of the Wood volumes were re-issued year after year over a period of at least half a century.

My thanks are due to Miss Hazel Joslyn, Archivist, Dartmouth College Library, for checking entries in certain issues of some of Wood's works which are not available in the Boston libraries. The late W. W. Eggleston presented his large personal collection of Wood's botanical treatises to Dartmouth College. I am also under obligations to the National Academy of Sciences for a research grant from the Bache Fund which enabled me to complete this task.

Overlooked Names and corrected Entries

Pteridophyta

Adiantum *Curtisii Wood, Class-Book, ed. 1861, 820. 1861 = *A. Capillus-veneris* Linn.

"We saw specimens of a new Adiantum in the herbarium of Rev. M. A. Curtis from the Mts. of N. Car. But our notes are insufficient at present for its proper diagnosis." The same statement appears on the same page of all issues up to 1880. In the 1881 issue of the Class-Book the place of *Adiantum Curtisii* Wood was taken by *A. Capillus-veneris* Linn., but no mention is there made of the former binomial. No description of *A. Curtisii* Wood was ever published. See the quotation from Curtis's letter of 1857 to Asa Gray, p. 115.

Antigramma *pinnatifida Wood, Class-Book, ed. 1861, 822. 1861 = *Asplenium pinnatifidum* Nutt. (1818).

At the end of the description Wood cites "Asplenium, Nutt.", the name-bringing synonym thus being *Asplenium pinnatifidum* Nutt. *Scolopendrium pinnatifidum* Diels (1898) is another synonym.

Antigramma *rhyzophylla Wood, l. c., sphalm. = *A. rhizophylla* J. Sm. = *Camptosorus rhizophyllus* (Linn.) Link.

Botrychium †neglectum Wood, Class-Book, ed. 2, 635. 1847; Class-Book, ed. 1861, 816. 1861 = *B. matricariaefolium* A. Br. (1843, 1845).

The current entry is to the 1861 issue of Wood's work, by Underwood, Bull. Torr. Bot. Club, **30:** 47. 1903, indicated as "[ed. 3]", the date 1860 being erroneous, and by C. Christensen Ind. Fil. 163, 1905, as "ed. II. 816. 1860." Both of these authors recognised Wood's species as a valid one. However, Wood described it in 1847, his type being from Meriden, New Hampshire. Robinson and Fernald in 1908 reduced it to *B. ramosum* (Roth) Aschers.

Camptosorus *ebenoides Wood, Am. Bot. Flor. 425. 1870 = *Asplenium ebenoides* R. R. Scott (1866).

Wood's entry is merely "C. ebenoides (R. R. Scott)", the understood name-bringing synonym being *Asplenium ebenoides* R. R. Scott.

Camptosorus *pinnatifidus Wood, l. c. = *Asplenium pinnatifidum* Nutt. (1818).

Wood's entry is "C. pinnatifidus (Nutt.)", this indicating the name-bringing synonym as *Asplenium pinnatifidum* Nutt. Gen. **2:** 251. 1818.

***Cistopteris** Wood, Class-Book 460. 1845, *nom.* in syn.; Class-Book, ed. 1861, 822. 1861, sphalm. = *Cystopteris* Bernh.

SPERMATOPHYTA

Abies *americana Wood, Class-Book ed. 2, 516. 1847, non Mill. (1768) = *Larix americana* Michx. (1803), i. e. *L. laricina* (Du Roi) Koch.

The entry "A[bies] (Larix) Americana. Michx. (Pinus pendula and microcarpa of *authors.*) *American Larch,*" clearly indicates what was intended by Wood.

Acerates *monocephala Lapham ex A. Gray, Man., ed. 2, 704. 1856, Revised ed. (School and College edition) iv. 1857; Lapham ex Hale, Trans. Wisconsin State Agr. Soc. **5:** 420. 1860 (reprint p. 4), *nom., nota,* et ex Wood Class-Book, ed. 1861. 594. 1861 = *Asclepias Nuttalliana* Torr. (1828).

In both issues of Gray's Manual cited full descriptions appear in the additions and corrections. The "Revised Edition" of 1857 differs from ed. 2, 1856, chiefly in the elimination of the treatments of the mosses and hepatics. Incidentally, in Gray's work is another unlisted binomial, published as a synonym, *Asclepias *Vaseyi* Carey ex A. Gray, l. c.

Aesculus ***Hippocastaneum** Wood, Obj. Les. Bot. 185. 1863, sphalm. = *A. Hippocastanum* Linn.

Alsine **†glabra** A. Gray ex Chapm. Fl. South. U. S. 49. 1860.

This is included here because Wood, Class-Book 260. 1861, also used the same binomial, his entry being "A. glabra," but at the end of the description he added "Arenaria Mx., nec Ell." Chapman credited the name to A. Gray, the name-bringing synonym being *Arenaria glabra* Michx. A. Gray, Man. ed. 2, 58. 1856, merely states at the end of his consideration of *Alsine* "A. glabra, of the mountain-tops of Carolina may occur on those of Virginia." He did not cite Michaux's binomial and provided no description.

Alsine ***stricta** Wood, Class-Book, ed. 1861, 260. 1861, non Mert. & Koch (1831) = *Arenaria stricta* Michx. (1803).

The basis of Wood's binomial is "Arenaria Mx. Alsine Michauxii Fenzl."

Anantherix ***connivens** Feay ex Wood, Class-Book, ed. 1861, 594. 1861 (*Asclepias connivens* Baldw.); A. Gray, Proc. Am. Acad. **12:** 66. 1877 = *Asclepias connivens* Baldw. (1817).

A. Gray's transfer of this name is sixteen years later than Wood's publication of it. Small, Man. Southeast. Fl. 1073. 1933, recognized this as *Anantherix connivens* (Baldw.) Feay, but failed to indicate the place of publication of the Feay binomial.

Andromeda ***polyfolia** Wood, Class-Book 231. 1845, sphalm. = *A. polifolia* Linn.

Andropogon ***clandestinus** Wood, Class-Book, ed. 1861, 809. 1861; Hale ex Vasey, Grasses U. S. 19. 1883, non Nees (1854) = *A. Elliottii* Chapm. (1860).

Hitchcock, Man. Grasses U. S. 790. 1935, listed Wood's binomial in the synonymy of *Andropogon Elliottii* Chapm. but did not note that it was unlisted.

Anethum ***faniculum** Wood, Class-Book 160. 1845, sphalm. = *A. Foeniculum* Linn. = *Foeniculum vulgare* Mill. (1768).

Apium ***angustifolium** Wood, Am. Bot. Flor. ed. 1877, 448. 1877 = *Berula erecta* (Huds.) Coville.

This was first inserted in the addenda to the 1877 issue of Wood's work, the entry following the description being "Sium, L. Berula, Kotch [Koch]." The name-bringing synonym would be *Sium angustifolium* Linn. (1763).

Arceuthobium *abigenium Wood, Class-Book, ed. 1881, 832. 1881 = *A. pusillum* Peck (1873) (*Razoumofskya pusilla* O. Kuntze).

Peck's species was based on specimens from Sandlake, New York, and Wood's species was based on specimens from the same locality, received from Peck. Earlier Wood had described it as a variety, *Arceuthobium oxycedri* Bieb. var. *abigenium* Wood, Am. Bot. Flor. 446. 1871, but, as a varietal name, *abigenium* of Wood (1871) cannot replace Peck's validly published binomial of 1873.

Aster *augustus Wood, Class-Book, ed. 1881, 829. 1881, sphalm. = *A. angustus* (Lindl.) Torr. & Gray.

Betula *excelsior Wood, Obj. Les. Bot. 281. 1863, sphalm. = *B. excelsa* Pursh = *B. lutea* Michx.

Boltonia *decurrens Wood, Class-Book, ed. 1869, 430. 1869 = *Boltonia latisquama* Gray, var. *decurrens* (Torr. & Gray) Fernald & Griscom in Rhodora, **42:** 492. 1940.

This was not indicated as new, nor is any synonym cited. The description is very short "lvs. oblong, margins decurrent on the winged stout stem; hds. corymbous, globular in fruit; ach. as in No. 1; rays purple. Bottoms W." It is suspected that Wood had a specimen from Engelmann or from Eggert. What he described is clearly the same as *B. asteroides* L'Hérit. var. *decurrens* Engelm. ex A. Gray, Syn. Fl. N. Am. **1** (2)**:** 166. 1884; Gray says "Missouri, *Eggert.*" This name goes back to *B. glastifolia* β *? decurrens* Torr. & Gray, Fl. N. Am. **2:** 188. 1842.

Cardamine *spatulata Wood, Class-book, ed. 1861, 231. 1861, sphalm. = *C. spathulata* Michx. = *Arabis lyrata* L.

Carex †argyrantha Tuckerm. ex Dewey, Am. Jour. Sci. II. **29:** 346. 1860, et in Wood, Class-Book, ed. 1861, 753. 1861; Tuckerm. ex Boott, Ill. Carex **3:** 119. 1862. The correct name for the species erroneously called *C. foenea* Willd. in recent manuals (see Svenson, Rhodora, **40:** 325. 1938).

Carex †cephaloidea Dewey, Rep. Pl. Mass. 262. 1840 et ex Wood, Class-Book, 415. 1845; Dewey ex Boott, Ill. Carex **3:** 123. 1862.

A valid species of wide distribution in eastern North America.

Carex †dubitata Dewey ex Wood, Class-Book, ed. 1861, 755. 1861; Dewey ex Boott, Ill. Carex **4:** 167. 1867 = *C. Bigelowii* Torr. (*C. concolor* sensu Mackenzie, not R. Br. Polunin, Bot. Can. East. Arct. **1:** 130, 1940, shows that the

type of *C. concolor* R. Br. (1823) is *C. aquatilis* Wahlenb., var. *stans* (Drej.) Boott. See also Fernald, RHODORA, **44:** 298. 1942.

Carex *leneoglochin Dewey ex Wood, Class-Book, 419. 1845, sphalm. = *C. leucoglochin* Linn. f. (1781) = *C. pauciflora* Lightf. (1777).

Carex *michigansis Dewey ex Wood, Class-Book, ed. 1861, 765. 1861 = *Carex lucorum* Willd. (1813).

Carex †mirata Dewey ex Wood, Class-Book 428. 1845; Dewey, Am. Jour. Sci. II. **39:** 71. 1865 = *C. atherodes* Spreng. (1826).

Carex †prairea Dewey ex Wood, Class-Book, ed. 2, 578. 1847; Dewey ex Wood, Class-Book, ed. 1861, 750. 1861.

A valid species very widely distributed in eastern North America.

Carex *prarisa Dewey ex Wood, Class-Book 414. 1845, sphalm. = *praec.*

Carex †retrocurva Dewey ex Wood, Class-Book. 423. 1845; Dewey, Am. Jour. Sci. II. **42:** 243. 1866 = *C. laxiculmis* Schwein. (1824).

Carex †Sartwellii Dewey, Am. Jour. Sci. **43:** 90. 1842 et ex Wood, Class-Book 413. 1845; Dewey ex Carey in A. Gray, Man. 539. 1848.

A valid species of wide North American distribution.

Carex *Stendelii Dewey ex Wood, Class-Book ed. 2, 583. 1847, sphalm. = *C. Steudelii* Kunth (1837) = *C. Jamesii* Schwein. (1824).

Carex †strictior Dewey ex Wood, Class-Book, 418. 1845; Dewey ex Wood, Class-Book, ed. 1861, 755. 1861.

A valid species of wide geographic distribution in eastern North America.

Carex *zanthosperma Dewey ex Wood, Class-Book, ed. 1861, 762. 1861; Dewey, Am. Jour. Sci. II. **42:** 334. 1866 = *C. flaccosperma* Dewey (1846).

In 1866 *Carex zanthosperma* Dewey was published as a new name for *C. flaccosperma* Dewey, but in the meantime it had been described five years earlier without association with the earlier name.

Chloris *floridana (Chapm.) Wood, Am. Bot. Flor., ed. 1871, 407. 1871; Vasey, Grasses U. S. 32. 1883, Descr. Cat. Grasses U. S. 61. 1885.

Chloris *glauca (Chapm.) Wood, l. c.; Vasey, l. c.

Both of these are valid species occurring in Georgia and Florida, the latter also in North Carolina. Wood's entries are merely "C. floridana (Chapm.)" and "C. glauca (Chapm.)". The name-bringing synonyms, inferred, are *Eustachys floridana* Chapm. and *E. glauca* Chapm. Fl. South. U. S. 557. 1860. Hitchcock noted the publication of Wood's two names in 1871 (they do not appear in the original 1870 edition which did not include a consideration of the genera and species of Gramineae and Cyperaceae), but he failed to note that neither binomial was listed.

***Cladastris** Wood, Class-Book 301. 1861, sphalm. = *Cladrastis* Raf.

Cyrtanthera *carnea Wood, Class-Book, ed. 1861, 536. 1861 (*Justicia carnea* Hook. [Lindl.], *Cyrtanthera magnifica* Nees) = *Jacobinia carnea* (Lindl.) Nichols. (*J. magnifica* Lindl.).

***Dasysistoma** Wood, Class-Book, ed. 1881, 830. 1881, sphalm. = *Dasystoma* Raf. ex Endl. (1839) = *Dasistoma* Raf. (1819).

Dasysistoma *grandiflora Wood, l. c. (*Gerardia grandiflora* Benth.) = *Aureolaria grandiflora* (Benth.) Pennell.

Dasystoma *integrifolia Wood, Class-Book, ed. 1861, 529. 1861 (*Dasistoma quercifolia*, var. ? β [*integrifolia*] Benth.) (*Gerardia integrifolia* A. Gray) = *Aureolaria laevigata* (Raf.) Raf.

Dasystoma *flava Wood, l. c. (*Gerardia flava* Linn.) = *Aureolaria flava* (Linn.) Farwell.

Dasystoma *grandiflora Wood, Am. Bot. Flor. 231. 1870 (*Gerardia grandiflora* Benth.) = *Aureolaria grandiflora* (Benth.) Pennell.

Dasystoma *pectinata Benth. in DC. Prodr. **10:** 521. 1846; Wood, Class-Book, ed. 1861, 530. 1861 (*Gerardia pectinata* Torr.) = *Aureolaria pectinata* (Nutt.) Pennell.

Dasystoma *pedicularia Benth. l. c.; Wood, Class-Book ed. 2, 409. 1847 (*Gerardia pedicularia* Linn.) = *Aureolaria pedicularia* (Linn.) Raf.

Dasystoma *pubescens Benth. op. cit. 520; Wood, l. c. (*Gerardia flava* sensu Pursh) = *Aureolaria virginica* (Linn.) Pennell.

Dasystoma *quercifolia Benth, l. c.; Wood, l. c. (*Gerardia quercifolia* Pursh) = *Aureolaria flava* (Linn.) Farwell.

These *Dasystoma* binomials are entered in Index Kewensis under *Dasistoma* Raf.

Desmodium *glutinosum [Muhl.] Wood, Class-Book 120. 1845; Schindl. Repert. Sp. Nov. **22:** 258. 1926 (*D. acuminatum* (Michx.) DC.).

Wood considered eleven species of *Desmodium*, and except for this one indicated the name-bringing synonym in each case.

Doubtless the basis of *D. glutinosum* Wood was *Hedysarum glutinosum* Muhl. ex Willd. Sp. Pl. **3** (2): 1198. 1802. Schindler independently made the same transfer in *Desmodium glutinosum* (Muhl.) Schindl., with extensive synonymy, in 1926. See Schubert, Rhodora **44:** 279. 1942, who has definitely shown that *Hedysarum glutinosum* Muhl. (1802) has priority over *H. acuminatum* Michx. (1803). The name *D. grandiflorum* (Walt.) DC. has been erroneously assigned to the same species, but Walter's type proves to be the same as *D. cuspidatum* (Muhl.) DC.

Dicliptera *americana Wood, Class-Book, ed. 2, 395, 1847 (*Dianthera americana* Linn., *Justicia pedunculosa* Michx.) = *Dianthera americana* Linn. (*Justicia americana* Vahl).

Euxolus *spinosus Feay ex Wood, Class-Book, ed. 1861, 618, 1861 = *Amaranthus spinosus* Linn.

This was described *de novo*, no synonym cited, the range given as from Pennsylvania to Illinois and southward. The description clearly applies to *Amaranthus spinosus* Linn., and it is probable that Feay's specific name was taken from the Linnaean binomial, although the latter was not mentioned.

Gerardia †Skinneriana Wood, Class-Book, ed. 2, 408. 1847 (*Agalinis Skinneriana* Britton).

A valid species; type from Green County, Indiana. It extends from southwestern Ontario to southeastern Kansas. The Index Kewensis entry is incomplete, merely indicated, after Wood, as "Class-Book (1847)," the page not given.

Gymnadenia *integra Wood, Class-Book, ed. 1881, 683. 1881 ("O[rchis] flava and nigra Nutt.") = *Habenaria integra* (Nutt.) Spreng. (*Platanthera integra* A. Gray, *Gymnadeniopsis integra* Rydb.).

This is a rather curious case. The entry is "G. integra (N.)" but the only synonyms cited are "O[rchis] flava and nigra Nutt." An examination of Nuttall's Gen. **2:** 188. 1818, shows that his fourth, fifth, and sixth species are *Orchis integra*, *nivea*, and *flava*. He described no *Orchis nigra*, an error in transcription being involved on the part of Wood; clearly *Orchis nivea* Nutt. was intended. Wood's description seems to apply to *Habenaria integra* (Nutt.) Spreng. rather than to the two other species described by Nuttall, which Wood listed as synonyms of his *Gymnadenia integra*.

Hydranthelium *crenatum Wood, Am. Bot. Flor. 228. 1870 = *H. egense* Poeppig (1845) = *Bacopa egensis* (Poeppig) Pennell, Proc. Acad. Sci. Phila. **98:** 96. 1946.

The description is short, Wood's material being indicated as from "Pools, Miss., La. (Dr. Hale)." Up to the present time this seems to have been collected in North America only by J. Hale; see Pennell, Proc. Acad. Nat. Sci. Phila. Monog. **1:** 62. 1935. It is suspected that the species was introduced into Louisiana through the agency of migratory birds such as the snipe. The occurrence of certain definitely Australian types in the Philippines, such as *Stylidium* and *Calogyne* (the latter also occurs near Amoy, China), may similarly be accounted for.

Hypericum *muticum Wood, Obj. Les. Bot. 170. 1863, sphalm. = *H. mutilum* Linn.

Lespedeza *Steuvei Wood, Class-book, ed. 1861, 310. 1861, sphalm. = *L. Stuevei* Nutt.

Lithospermum †lutescens Coleman, Kent Sci. Inst. Misc. Publ. **2:** 29. 1874 (Cat. Fl. Pl. S. Penins. Michigan 29), et ex Wood, Am. Bot. Flor. ed. 1874, 448. 1874 = *Lithospermum latifolium* Michx. (1803).

The Index Kewensis entry is "Coleman, Cat. Pl. Gr. Rapids Michig. 29. 1874" manifestly entered from Gray's Syn. Fl. N. Am. **2** (1): 203. 1878 who there placed Coleman's species as a synonym of *Lithospermum latifolium* Michx. as a form with yellowish white or sometimes light yellow flowers. The full title of Coleman's work is "Catalogue of Flowering Plants of the Southern Peninsula of Michigan, With a Few of the Cryptogamia". It was published in Grand Rapids, Michigan, as the Kent Scientific Institute Miscellaneous Publication **2:** 1–49. 1874. Coleman's original description is "L. lutescens, (n. sp.) Leaves large, ovate, lanceolate, nearly sessile, rough on the upper side; fls. yellow, larger than in *L. arvense;* seeds white, sometimes two—generally, but one; st. from 1½ to 3½ ft. high." See Fernald, Rhodora **46:** 496. 1944, for a critical note on the validity of Michaux's binomial.

Lobelia *Douglassii Wood, Class-Book, ed. 1881, 478. 1881 (*Clintonia* [*elegans*] Douglas, *Downingia elegans* Torr.) = *Downingia elegans* (Dougl.) Torr. (*Bolelia elegans* Greene).

In the earlier issues of the Class-Book from 1861 on the species appears as *Clintonia elegans* Dougl., which is its name-bringing synonym.

Lophiola †americana Wood, Class-Book ed. 2, 540. 1847, Class-Book, ed. 1861, 697. 1861 (*Conostylis americana* Pursh) = *Lophiola aurea* Ker-Gawl. (1813).

Although Wood published this first in 1847 and again in 1861, Coville in 1894, and Baillon in 1895, independently made the same transfer of Pursh's specific name; all are properly listed except Wood's first publication. Ker-Gawler's name has about one year's priority over that of Pursh.

Lysimachia *asperifolia Wood, Obj. Les. Bot. 243. 1863, sphalm. = *L. asperulaefolia* Poir.

Myrica *floridana Wood, Am. Bot. Flor. 309. 1870 = *Leitneria floridana* Chapm. (1860).

The entry is "M. Floridana (Chapm.)", no synonym cited. The basis of Wood's name was unquestionably *Leitneria floridana* Chapm., for Chapman in describing the new genus *Leitneria* placed it in the Myricaceae. It typifies the family Leitneriaceae.

Narcissus *Daffodil Wood, Obj. Les. Bot. 292. 1863 = *N. Pseudo-Narcissus* Linn.

Orchis †Hookeri Wood, Obj. Les. Bot. 288. 1863 = *Habenaria Hookeri* Torr.

The current entry is to Wood, Am. Bot. Fl. 327. 1870.

Orchis †Michauxii Wood, Obj. Les. Bot. 288, 1867 = *Habenaria quinqueseta* (Michx.) Sw.

The current entry is also to Wood, Am. Bot. Fl. 327. 1870.

Orchis *nigra Wood, Class-Book, ed. 1881, 683. 1881, *nom.* in syn., sphalm. = *Orchis nivea* Nutt. (1818) = *Habenaria nivea* (Nutt.) Spreng.

Orchis *physcodes Wood, Class-Book, ed. 2, 534. 1847, sphalm. = *O. psycodes* Linn. = *Habenaria psycodes* (Linn.) Spreng. (*Blephariglottis psychodes* Rydb.).

Papaver *Rheas Wood, Obj. Les. Bot. 159. 1863, sphalm. = *P. Rhoeas* Linn.

Peltandra *glauca (Ell.) Feay ex Wood, Class-Book, ed. 1861, 669. 1861 (*Caladium *glaucum* Ell. Sketch **2:** 631. 1824) = *Peltandra sagittifolia* (Michx.) Morong; see Fernald, Rhodora **50:** 58–59. 1948.

Recognized by Small, Man. Southeast. Fl. 246. 1933, as a valid species. He cited as synonyms *Peltandra alba* Raf., *P. sagittifolia* Morong, and *Xanthosoma sagittifolium* Chapm., but rather curiously not Elliott's name-bringing synonym, *Caladium*

***glaucum* Ell. Sketch **2:** 631. 1824, which like *Peltandra glauca* Feay (1861) also proves to be unlisted; neither did he indicate the place of publication of the Feay binomial. This is the second case where in my investigations of early American botanical literature I find neither the original binomial, or that of some other author based on it, to be listed, the second one being *Ophrys* **pubera* Michx. Fl. Bor. Am. **2:** 158. 1803 = *Epipactis* **pubera* Muhl. Cat. 81. 1813 = *Ponthieva glandulosa* (Walt.) Mohr.

Peucedanum *rigidum Wood, Am. Bot. Flor. 136. 1870, non Bunge (1832) = *Oxypolis rigidior* (Linn.) Raf.

No synonym was cited, but clearly the basis of the name was *Sium rigidius* Linn. the specific name accepted by various authors under *Oenanthe*, *Pastinaca*, *Archemora*, etc. as *rigida*. See Mathias and Constance, N. Am. Fl. **28B:** 220. 1945, who, among the 23 synonyms cited, list Wood's binomial.

Phlox *Laphamii Wood, Obj. Les. Bot. 265. 1863 = *P. divaricata* Linn.

Although Wood indicated no authority and cited no synonym, the basis of this binomial was undoubtedly *Phlox divaricata* Linn. var. *Laphamii* Wood, Class-Book, ed. 1861, 569. 1861, there characterized as: "Lvs. ovate, *pet. obtuse, entire.*—Wis. (Lapham) Western Reserve (Cowles) and southward, not uncommon."

Potamogeton †obrutus Wood, Class-Book ed. 2, 525. 1847, Class-Book, ed. 1861, 675. 1861 = *P. alpinus* Balbis, var. *tenuifolius* (Raf.) Ogden in Rhodora, **45:** 90, 1943 (*P. tenuifolius* Raf. Med. Repos. hex. 3, **2:** 409, 1811; Fernald in Rhodora, **33:** 210. 1931).

The Index Kewensis entry is "Wood, Class-Book 178. 1845." *Potamogeton obrutus* Wood does *not* appear in the first edition of Wood's work. Type from the Passumpsic River, Lyndon, Vermont.

Rhododendron *procumbens Wood, Class-Book 236. 1845 (*Azalea procumbens* Linn.); Krause in Sturm, Fl. Deutschl. ed. 2, **9:** 214. 1901 = *Loiseleuria procumbens* (Linn.) Desv. (*Chamaecistus procumbens* O. Kuntze).

This is one of two new names other than a certain number of species of *Carex*, that genus elaborated by Dewey, published by Wood in the first edition of his Class-Book.

Rumex †altissimus Wood, Class-Book ed. 2, 477. 1847; Proc. Am. Assoc. 177. 1853.

Wood's type was from Indiana. A valid species extending from Connecticut to Iowa and Nebraska southward to Mexico.

Sabbatia †concinna Wood, Class-Book, ed. 2, 451. 1847, Class-Book, ed. 1861, 584. 1861 = *S. campestris* Nutt. (1837).

The Index Kewensis entry is to the 1861 edition of Wood's Class-Book where *S. concinna* Wood appears only as a synonym of *S. brachiata* Ell., "S. concinna, 2nd. Ed." I think, however, that it is the same as *S. campestris* Nutt., not *S. brachiata* Ell., as the latter species does not occur in Iowa; Wood's type was from Iowa.

Salvia *sclary Wood, Class-Book 274. 1845, sphalm. = *Salvia Sclarea* Linn.

Sarracenia *alata Wood, Obj. Les. Bot. 157. 1863 = *S. Sledgei* Macfarlane in Engler, Pflanzenr. **4**[110]. 29. 1908.

Wood's brief statement is: "*narrow-winged P.* Fls. yellow. Lvs. all more slender than No. 1 [*S. purpurea* Linn.]. S.-W." The basis of the binomial was doubtless *Sarracenia Gronovii* Wood, var. *alata* Wood, Class-Book, ed. 1861. 222. 1861, there characterized as: "Fls. yellow? large; lvs. 1–2f high, with the tube somewhat ventricous above, throat contracted, wing conspicuous (½′ broad). La. (Hale).—A remarkable variety." *S. Gronovii* of Wood was a substitute-name for *S. flava* Linn. and its allies with "*Lvs. tall, straight, erect*"; and he included under it, not only true *S. flava* (*S. Gronovii*, var. *flava* (Linn.) Wood, l. c.), but *S. rubra* Walt. (*S. Gronovii*, var. *rubra* (Walt.) Wood, l. c.), *S. Drummondii* Croom (*S. Gronovii*, var. *Drummondii* (Croom) Wood, l. c.) and the new var. *alata* from Louisiana. Macfarlane, l. c., in describing his new *S. Sledgei*, cites as the first synonym "?*S. Gronovii* var. *alata* Wood.", his new species cited from a number of stations in Louisiana, with "Folia . . . vernalia . . . 30–70 cm. × 2–4 cm, erecta . . . petiolus basi alatus . . . ala ventralis a basi ad ⅓ alt. gradatim expansa". Since, as Professor Fernald indicates to me, *S. Sledgei* is well represented in the Gray Herbarium from Louisiana, while none of the three remaining species included by Wood under his *S. Gronovii* is cited by Macfarlane from so far west, it is apparent that *S. alata* Wood (1863) must replace *S. Sledgei* Macfarlane (1908).

*__Schaenocaulon__ Wood, Class-Book, ed. 1861, 719. 1861, sphalm. = *Schoenocaulon* A. Gray (1837).

Schoenolirion *croceum (Michx.) Wood, Am. Bot. Flor. 345. 1870; A. Gray, Am. Nat. **10:** 427. 1876.

Wood's entry is merely "S. croceum (Mx)" the name-bringing synonym, *Phalangium croceum* Michx., inferred. *Oxytria crocea* Raf. is a synonym.

Scutellaria †rugosa Wood, Class-Book ed. 2, 424. 1847; Wood, Proc. Am. Assoc. 176. 1853 = *S. versicolor* Nutt. (1818).

Wood's type was from Harper's Ferry, Virginia (now West Virginia), on rocky banks of the Shenandoah River.

Senecio †anonymus Wood, Class-Book, ed. 1861, 464. 1861, Am. Bot. Flor. 187. 1870 = *S. tomentosus* Michx. fide Greenman in lit. (ex descr.).

The type was from Montgomery, Alabama. Wood did not indicate this as new in 1861, but in 1870 he added his own name as authority for the binomial.

*__Sentera__ Wood, Class-Book, ed. 1861, 595. 1861, sphalm. = *Seutera* Reichb. = *Cynanchum* Linn. (*Lyonia* Ell., 1817, non Raf. 1808, nec Nutt. 1818).

*__Simplocarpus__ Wood, Class-Book, ed. 1861. 669. 1861, sphalm. = *Simplocarpus* Schmidt (1868), sphalm. = *Symplocarpus* Salisb. (1818).

Smilacina *trifoliata Wood, Class-Book, ed. 1861, 715. 1861, sphalm. = *S. trifolia* (Linn.) Desf.

Smilax *maritima Feay ex Wood, Class-Book, ed. 1861, 702. 1861 ("S. Beyrichii Kunth ? S. ovata Ph.") = *Smilax auriculata* Walt. (1788).

In accepting Feay's new binomial Wood states: "The latter name [*S. ovata* Pursh], although the earliest, is utterly inappropriate." Pursh's type was from near Savannah, Georgia; Wood states: "Sandy bluffs of the salt-water rivers near the coast, Savannah and southward."

Solanum *pycnanthum Wood, Class-Book, ed. 1861, 577. 1861, sphalm.

Wood credited the binomial to Dunal, stating "Ga. about Savannah (Dunal, apud DC. Sed dubito)." It is entirely unlikely that what Wood described is the same as the tropical South American *S. pycnanthemum* Dunal.

Solidago *squarrulosa Wood, Class-Book, ed. 1861, 431. 1861 (*S. squarrosa* Nutt., *S. petiolaris* Ait. ?) = *Solidago petiolaris* Ait.

Wood's entry is "S. squarrulosa (T. & G.)," i. e., *Solidago petiolaris* Ait. var. *squarrulosa* Torr. & Gray, N. Am. Fl. **2:** 203. 1842, which was based on *S. squarrosa* Nutt. Jour. Acad. Nat. Sci. Phila. **7:** 102. 1834, non Nutt. Gen. (1818), and which Gray later, Syn. Fl. N. Am. **1** (2)**:** 144. 1884, placed in the synonymy of *S. petiolaris* Ait. This is one of the few cases where Wood made minor changes in the later issues of his work for in the 1881 issue, p. 431, he eliminated *S. petiolaris* Ait. from the synonymy, substituting the statement "S. petiolaris Ait. is the prior name, but inappropriate."

Syringa *alba Wood, Obj. Les. Bot. 274. 1863 = *S. vulgaris* Linn. var. *alba* Weston.

Wood's brief statement is merely: "White Lilac. Flowers pure white. Shrub taller (Variety of no. 1 [*S. vulgaris* Linn.])". Two years earlier (Class-Book, ed. 1861) he included it as *Syringa vulgaris* var. *alba*.

Tephrosia *gracilis Wood, Am. Bot. Flor. 95. 1870.

The entry is "T. gracilis Wood", the indicated range Florida to Louisiana. It is clearly not the same as the earlier *T. gracilis* Nutt. (1818) which is apparently a synonym of *T. hispidula* Michx. (1803).

Trichelostylis †capillaris Wood, Class-Book ed. 2, 573. 1847, Class-Book, ed. 1861, 782. 1861 (*Scirpus*, Linn., *Isolepis*, R. & S.) = *Bulbostylis capillaris* (Linn.) C. B. Clarke (*Stenophyllus capillaris* Britton).

Trichelostylis *leptalea Wood, Am. Bot. Flor., ed. 1871, 364. 1871 = *Scirpus cernuus* Vahl (1806).

The entry is "T. leptalea (Schultes)." The name-bringing synonym is thus *Isolepis leptalea* Schultes, Mant. **2:** 62. 1822. If Wood's interpretation be correct, this should be the same as Vahl's species. He included it as an exotic species, cultivated in conservatories, from southern Europe.

Utricularia *Robbinsii Wood, Am. Bot. Flor. 216. 1870 = *U. vulgaris* Linn. (*U. macrorhiza* Le Conte).

Wood's description is short and he cites no synonyms. Clearly what he here described, as a species, is the form that he charac-

terized earlier as *U. intermedia* Hayne *β? Robbinsii* Wood, Class-Book, ed. 1861, 510. 1861: "Swamps, Uxbridge, Northbridge, Mass. (Robbins)". As a varietal name this antedates *U. vulgaris* Linn. var. *americana* A. Gray, Man. ed. 5, 318, 1867. I accept Fernald's conclusions that, in view of the more or less parallel variability of both the European and the American forms, there is no justification in recognizing a distinct species (*U. macrorhiza* LeConte) or a variety here; see Fernald, Rhodora **43:** 642–645. pl. 694. 1941.

Vigna †hirsuta Feay ex Wood, Class-Book, ed. 1861, 320. 1861 (*V. glabra* Savi? *Dolichos luteolus* (Ell.) Feay ex Wood, Am. Bot. Flor. 96. 1870, non S. F. Gray, (1821), nec K. Koch (1837) = *Vigna repens* (Linn.) O. Kuntze (*V. luteola* Jacq.)

Vincetoxicum *scoparium Wood, Am. Bot. Flor. 274. 1870; A. Gray, Syn. Fl. N. Am. **2** (1): 102. 1878 = *Cynanchum scoparium* Nutt. (*Amphistelma scoparium* Small).

The entry is "*V. scoparium* (N.)," no synonym cited; this would be *Cynanchum scoparium* Nutt.

Arnold Arboretum.

JOHN CRAWFORD PARLIN

Ralph C. Bean

John Crawford Parlin died on February 24, 1948, at the home of his daughter, Mrs. Herbert Stevens at Canton Point, Maine. He will be missed not only for his botanical work but also for his kindly friendliness.

Mr. Parlin was born near Trap Corner, Paris, Maine, March 20, 1863, the son of William and Lois Haley Parlin, and was in his eighty-fifth year at the time of his death. As a boy he lived in Paris and the surrounding towns, receiving most of his formal education from the town schools. He began teaching in the town of Woodstock and subsequently taught in North Berwick, Albion, Norridgewock, Freedom, Hartford, Rumford and Canton, with five summer terms at the Washington State Normal School at Machias, Maine, where one of his subjects was botany. In his long teaching career his subjects in the classroom were Latin

and mathematics. He has been President of the Teachers' Association in Somerset and Waldo Counties and has served on the Executive Board of the Maine Teachers' Association.

In 1926 Mr. Parlin retired after 48 years as a teacher and went to live at Canton Point, Maine, looking forward to having more time to devote to his botanical work. In March, 1936 the spring floods swept through his home and destroyed his collections of many years. Since that time he lived at Buckfield and has not ceased in his botanical explorations.

All his life Mr. Parlin was a student of the plants of his native state. In the towns where he lived he literally combed every sort of locality again and again. For many years his interest was in the study of the flowering plants and ferns. His discovery of a previously unrecognized *Antennaria* led to the more intensive study of that genus. Prof. Fernald named his find *Antennaria Parlinii* in his honor in 1897. He was always a keen observer and found many unusual plants.

During the later years of his life he devoted most of his time to mosses and lichens. Again and again he would find species and forms which had not previously been found in Maine or the northeast. He had extensive correspondence with specialists both in the United States and in Europe.

He was a member of the Maine Historical Society, the Portland Society of Natural History, the Stanton Bird Club of Lewiston-Auburn, the Sullivant Moss Society, the New England Botanical Club and was a charter member of the Josselyn Botanical Society of Maine. In July, 1947 the University of Maine conferred on him an honorary degree of Master of Science in recognition of his outstainding work.

In every community where he lived he left people who owed their interest and love of the out-of-doors to him. In recent years his attendance at the summer meetings of the Josselyn Botanical Society gave the present members an opportunity to profit by his knowledge of the Maine plants. He always gave of his best to all, no matter how amateur they might be. His interest and enthusiasm was stimulating and those about him quickly responded. His kindliness and botanical enthusiasm will be long remembered.

Wakefield, Mass.

New Names for Two Brazilian Species.—**Rhynchospora Hunnewellii** L. B. Smith, nom. nov. *Pleurostachys gracilis* Boeckl. in Allg. Bot. Zeit. 2: 111. 1896, non *Rynchospora gracilis* (Sw.) Vahl, Enum. 2: 234. 1806.

The specific name is made in honor of Mr. Francis Welles Hunnewell, who collected the plant on a recent foray in the vicinity of Rio.

Ficus officinalis L. B. Smith, nom. nov. *Pharmacosycea perforata* Miq. in Hook. London Journ. Bot. 7: 68. 1848, non *Ficus perforata* L. Amoen. Acad. 8: 265. 1775.

The name "officinalis" will serve to retain some of the medicinal flavor of "Pharmacosycea".—Lyman B. Smith, Smithsonian Institution.

A prostrate Rorippa in the Interior.—Herewith is recorded a Minnesota locality of Professor Fernald's prostrate *Rorippa*. The plants were discovered on shores of two exsiccating ponds at Island Lake, 20 miles north of Duluth, where Highway No. 4 intervenes between the ponds and the lake. The prostrate plants, in association with the typical form, rooted at the nodes and, growing toward the receding water-line, were still anchored to the drying mud by their primary roots. The striking creeping habit, runner-fashion, was further accented by the development of short, leafy axillary inflorescences some in mature fruit. The collection, *Lakela* no. 6738, August 31, 1946, is readily identified as *Rorippa islandica* (Oeder) Borbas, var. *microcarpa* (Regel) Fernald, f. *reptabunda* Fernald, Rhodora, Feb. 1948, described from New Hampshire, the name corrected in the April number, p. 100, to Var. *Fernaldiana* Butters & Abbe, forma *reptabunda* Fernald.—Olga Lakela, University of Minnesota, Duluth Branch, Duluth, Minnesota.

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Very sincerely

Fred K. Butler.

Rhodora

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THE NEW ENGLAND BOTANICAL CLUB

Vol. 50. June, 1948. No. 594.

FREDERIC KING BUTTERS, 1878–1945[1]

ERNST C. ABBE

(with portrait)

Felix qui potuit rerum cognoscere causas
Atque metus omnes, et inexorabile fatum
Subjecit pedibus

—Vergil

Fred Butters deeply appreciated the truth of Vergil's aphorism, translating it "Happy the man who is able to know the causes of things, and to put under his feet all fear and inexorable fate."[2] It is a sentiment which expresses succinctly and aptly the guiding principles of his rich and friendly life.

Butters was born and raised in Minneapolis. Nevertheless, his family environment was New England in character, an influence which was strengthened by visits as a boy to relatives in Massachusetts. This influence colored even his speech, sometimes to the consternation of his classes at examination time, as in the case of the unfortunate student who was surprised

[1] Contribution from the Herbarium of the University of Minnesota, VIII.

This biographical sketch has been made possible through the generous cooperation of Dr. Butters' friends and colleagues. Professor L. I. Smith of the Department of Chemistry, University of Minnesota, has given free access to the original materials concerning Dr. Butters in his possession. To my colleagues, W. S. Cooper, C. S. French, A. O. Dahl, D. B. Lawrence, R. M. Tryon, Jr., and especially to Professor Emeritus C. O. Rosendahl, a life-long friend of Dr. Butters, I am deeply indebted for contributions of fact and anecdote.

The photograph of Dr. Butters was taken August 11, 1938 on Prospect Mountain, Estes Park, Colorado, by J. W. Opie.

Dr. L. I. Smith has provided funds for the portrait.

[2] From his Presidential Address, University of Minnesota Chapter, Sigma Xi, June, 1938.

to find that there is no such plant as the "Sawed" Fern. His home life as a boy provided a rich background of books and music, intellectual activity, and moderate wealth, all of which entered into the making of Butters, the man. He carried through life a love of reading of the most systematic and catholic sort. This was so thoroughly appreciated by his students and colleagues that the apocryphal story was often told newcomers that "Dr. Butters is now re-reading the *Encyclopedia Britannica* for the third time, and is at the letter 'G'." Certainly his broad scientific knowledge justified the assumption. Music was very important to him. Beethoven was his especial favorite and was played by him on the family piano with the greatest precision, almost as though the notes represented a problem in mathematics. His love of music also found expression in his perennial support of the Minneapolis Symphony Orchestra as one of its patrons.

His means permitted Butters to make a series of trips and excursions which always resulted in additions to his store of knowledge and anecdote as well as to maintain the gracious family home to which he was deeply attached, and to indulge quietly in a wide variety of philanthropies.

While he did not advertise "family", he was aware of the responsibilities attendant upon a distinguished New England ancestry. This reached back on his father's side to William Butter who came from Scotland to settle near Woburn, Massachusetts, before 1666, and on his mother's side to Captain John King who also settled in eastern Massachusetts.

Fred Butters began school in Minneapolis where he prepared himself for attendance at the University of Minnesota by completing the "Latin" course in Central High School, in June, 1895. He entered the College of Science, Literature and the Arts of the University of Minnesota, enrolling in the "Scientific Course". His grades from the start were high, predominantly in the 90's, earning for him election to Phi Beta Kappa and Sigma Xi during his senior year. In later life he was elected to the presidency of the local chapters of both of these honor societies. Mathematics, which he followed in college through integral calculus, he practiced constantly thereafter. Sometimes this practice took the form of mathematical "doodling" which whiled away the time during many a boring Ph.D. examination. Even

yet we find about the Department an occasional box in which came his favorite Benson and Hedges cigarettes, the white paper covered with the details of the expansion of a binomial. Astronomy, which he also studied assiduously in college, provided the basis for a life-long hobby. The other natural sciences were well represented in his undergraduate studies, particularly botany. Here he fell under the spell of that inspiring teacher, Conway Macmillan, whose newly-formed Department of Botany provided Butters with the opportunity to explore the fields of algology, physiology, cytology and morphology by the time he had completed his senior year in June 1899. At this time he had a strong interest in algae which is evidenced by his first paper, "Observations on *Rhodymenia*", published in the second volume of *Minnesota Botanical Studies* (1899). An active interest in algae extended to 1911 when he published a paper on *Liagora* and *Galaxaura*.

The academic year following the completion of his bachelor's degree at Minnesota saw Butters hard at work at Harvard where he obtained an A.B. in the spring of 1900. His interest in thallophytes brought him into close contact with Thaxter, and ultimately led to the publication of a paper on the *Xylariaceae* of Minnesota (1901) and a note in 1903 on a Minnesota species of *Tuber*.

In 1901 Butters joined the staff of the University of Minnesota as Instructor and served continuously on the faculty until his death, with the exception of a leave of absence taken in 1916-1917 to complete his work for the Ph.D. at Harvard.

In 1901 the Minnesota Seaside Station was established on Vancouver Island largely because of the enthusiasm and interest of Professors Macmillan and Tilden, who felt that students at a mid-continental University badly needed the opportunity to study salt-water plants in their native habitats. That summer was the first of several spent by Butters at the Station. He first applied himself to the study of marine algae; later his interests turned to Ferns and Gymnosperms. He also vastly enjoyed the extra-curricular activities at the Station. In one of these, the cult of the mythical Hodag, he became the mock High Priest; another was his post as skipper of the large dug-out canoe in which supplies for the Station were ferried ashore from the

small coastal steamer. This canoe he had to guide between the numerous off-shore rocks and through the high surf. Out of such experiences came a great fund of stories, one of his favorites concerning the time when the stopper came out of the hole in the bottom of the canoe. He would graphically describe how the salt water spurted up and threatened a precious load of microscopes by promising to swamp the canoe, passengers, microscopes and all.

Butters spent the summer of 1902 in Europe with his friend H. L. Lyon. His association with Lyon on this trip and in the Department of Botany led to a life-long interest in embryology. An immediate evidence of this was the publication in 1909 of a paper on the seeds and seedlings of *Caulophyllum thalictroides*. He was deeply intrigued by the relation between the monocotyledonous and dicotyledonous state. Ultimately this interest led to the development of courses in plant anatomy, a subject which he taught throughout his academic career.

In 1904 Butters met E. W. D. Holway, an Iowan banker. Holway was an expert on rusts, and also a mountain climber of great ability, and his enthusiasm for this sport was readily transmitted to Butters. From that time on, hardly a summer passed that Butters did not find at least some time to visit Glacier House and his beloved Selkirk Mountains. He used to say that he had but one criticism to make of Minnesota—that it had no mountains, and he once suggested the provision of such as a worthy project for the WPA! Butters and Holway were later joined by Howard Palmer, a Connecticut manufacturer, and for parts of many summers this trio was very active in exploring the Selkirk Mountains. This region was very close to Butters' heart and it is fitting indeed that the Geographic Board of Canada has recently named the highest peak in the Battle Range of the Selkirks Mt. Butters, in his honor. Along with his strenuous pioneer mountaineering in the Selkirks he collected plants, summarizing his observations in "The Vegetation of the Selkirk Mountains" as an appendix to Howard Palmer's book "Mountaineering and Exploration in the Selkirks". Another article dealing with some peculiar cases of plant distribution in the Selkirks was also published in 1914 in *Minnesota Botanical Studies*. Butters' achievements in mountaineering were widely

recognized among the mountaineering fraternity and he cherished greatly his memberships in the American Alpine Club, the Alpine Club of Canada, and the Royal Geographical Society.

After he became interested in mountaineering, Butters still found time to go to the Minnesota Seaside Station. In the summer of 1906, he, C. O. Rosendahl, N. L. Huff and Arthur M. Johnson made an epic trip across Vancouver Island by way of a purported wagon road. Butters' comment on this was that in order to get a wagon across parts of that road they must have taken the wagon apart! This trip was the beginning of a long and close association between Rosendahl and Butters. "Fred" and "Otto" were to take many field trips together and publish much scientific work jointly. Their last visit to the Seaside Station was in the summer of 1910, when they were accompanied by Mrs. Rosendahl.

At about this time Butters and Rosendahl began collaborative publication of the Minnesota "Guides"—Guide to Spring Flowers, to Trees and Shrubs, to Ferns and Fern Allies, to Autumn Flowers—the first being published in 1908. Some went into many editions and one ultimately grew into a widely used book, "Trees and Shrubs of Minnesota", last published in 1928. The book on trees and shrubs so indissolubly linked the authors in the minds of their students that its authorship was attributed among some of them to a mythical "Rosenbutters".

Butters had an initial interest in the flora of Minnesota which was intensified from 1915 on. During that summer, he and Rosendahl acquired a Ford and began active exploration of many out-of-the-way localities in the state. This work led to the publication in 1916 of "Reputed Minnesota Plants Which Probably Do Not Occur In The State". Trips into that part of the Driftless Area which lies in the southeastern corner of the state raised basic questions of plant geography. The "Coastal Plain" element in the flora of the state fascinated him. There arose also the opportunity to check the map of forest distribution published many years before by Upham.[3] Butters had noted that Upham showed limited areas of woodland on the northeastern side of many lakes in the ecotone between prairie and

[3] Upham, W. Catalogue of the Flora of Minnesota. Geol. & Nat. Hist. Surv., Twelfth Annual Report (1883), Pt. VI, pp. 1–193. 1884.

forest. He found that these had been mapped accurately by Upham and he liked to theorize concerning their origin, bringing in as factors the age-long burning of the prairies by the Indians, the direction of the prevailing winds, and the role of the lakes as natural barriers.

Then came a most important interlude—his sabbatical year, 1916–17. At this time Butters went to the Gray Herbarium at Harvard to carry out the work for his Ph.D., which was conferred in June, 1917. Although the title of his thesis is "Studies in the Geographical Relations of the Plants of the Selkirk Mountains", the published results of his work at the Gray dealt with *Lathyrus*, *Pellaea*, *Athyrium* and *Botrychium*. His work on *Lathyrus* was published jointly with his good friend Harold St. John.

While the deep interest which Butters had in ferns may be traced in the memory of his friends to the early days at the Minnesota Seaside Station, it did not crystallize until ten years later at the Gray. The ferns from that time on became the center of his scholarly activity, as evidenced by his advanced course on "Pteridophytes" which he gave regularly thereafter, by the meticulous care with which he managed the Fern Herbarium at the University of Minnesota, and by his publications.[4] It is impossible to pass over the Gray Herbarium year without mentioning his friendship with Weatherby and Fernald. Scarcely a day in the University of Minnesota Herbarium would pass, as his close associates will testify, without the name of one or the other coming up in conversations concerning taxonomic and phytogeographical problems. He held their judgment and achievements in the highest regard and often referred to his association with them at the Gray. Undoubtedly they deeply influenced his taxonomic thinking and stimulated his natural interest in problems of plant distribution and plant geography in the world at large.

Weatherby still tells of Butters' year at the Gray. Apparently Butters would apply himself closely to business all through the week. But when Saturday afternoon came, Butters, the born raconteur, would regale his appreciative listeners with story after story of his experiences in the Selkirks. These adventures were,

[4] Butters' friends, when they refer to his papers, may well remember with amusement one of his favorite definitions—"A scholarly paper consists of a trickle of words in a sea of footnotes".

of course, still very fresh in his mind. And as the stories progressed his listeners felt themselves to be almost literally with him as he faced the mother grizzly and her cubs in a narrow canyon, or as he clung precariously in a difficult traverse on Mt. Sir Sanford.

During his year at the Gray, Butters was elected to the New England Botanical Club. This, together with membership in the American Fern Society, he valued in a very personal way.

After his return to Minnesota, Butters devoted the greater share of his research time to ferns and other plants of Minnesota. His teaching activities expanded to include the direction of graduate students. These he put to work on problems in his old favorite field of embryology. Thus, Buell worked on *Acorus* and Earle on *Magnolia*. At the undergraduate level of teaching his ability was recognized by his appointment to the Committee of the Botanical Society of America on the Teaching of Botany in American Colleges and Universities. The work of this Committee extended over several years and culminated in the publication of the widely consulted Bulletins 119 and 120.[5] Another evidence of Butters' breadth of interest in teaching was his successful participation in one of the early survey courses in the natural sciences at the University of Minnesota, "Man in Nature and Society",—a precursor of courses so familiar to students of the General Education movement today.

Butters was most generous in helping colleagues with research problems. Two concrete cases come to mind, the one related to his knowledge of classical languages and the other to his mathematical bent. With reference to the first, Mrs. Sorokin acknowledged[6] his initiation of the terms monobrachial, dibrachial, etc. to describe certain chromosome-types. The second is to be found in his careful checking of the formulas for sectional area and volume of the paraboloid of revolution as applied to the shoot apex of maize.[7]

[5] An Exploratory Study of the Teaching of Botany in the Colleges and Universities of the United States. Bot. Soc. Amer. Bull **119,** pp. 1–46. 1938.

Achievement Tests in Relation to Teaching Objectives in General College Botany. Bot. Soc. Amer. Bull. **120,** pp. 1–71. 1939.

[6] H. Sorokin. Idiograms, nucleoli, and satellites of certain Ranunculaceae. Amer. Jour. Bot. **16:** 408. 1929.

[7] Randolph, L. F., E. C. Abbe, J. Einset. Comparison of shoot apex and leaf development and structure in diploid and tetraploid maize. Jour. Agric. Res. **69:** 47–76. 1944

During World War I, Butters taught mathematics and other non-botanical courses so effectively that Burton, then President of the University of Minnesota, is said to have commented that if Dr. Butters were completely ignorant of Botany the University would still be able to appoint him as Professor of Mathematics, or of Astronomy, or of Geology, or of Pharmacy.

President Burton's comment about Butters' ability to teach pharmacy is significant and perhaps requires explanation. Pharmacy was an early love and one with which Butters retained contact always. He taught Botany to generation after generation of young pharmacists (over 2000 of them) from 1901 on. He appreciated the privilege of membership on the staff of the College of Pharmacy and enjoyed his associations there. He served for many years as botanical consultant to the staff of the *National Formulary*.

As a geologist, Butters became deeply engrossed in the study of glacial phenomena which are so evident but which were so poorly understood in the state of Minnesota. He and Rosendahl together developed a deep knowledge of these phenomena which contributed richly to their botanical teaching. Professor W. H. Emmons, formerly head of the Department of Geology, once remarked that Butters was the best geologist on the campus outside of the Department of Geology. This was indeed a compliment in view of the distinguished character of the Geology Department and of its head. At first it was the Driftless Area that drew Butters' attention. But, in the course of an automobile trip to northeastern Minnesota and near-by Canada with some of his non-botanical friends, he discovered evidence suggesting the existence of another area which possibly had not been glaciated during the Wisconsin. The Minnesota portion of this area (in Cook County) he studied with the greatest care during the last dozen or so years of his life. It was the good fortune of the writer to be his companion on many trips to Cook County. These were indeed a revelation since there is no better way to become acquainted with a man than to camp with him, and these experiences have left nothing but admiration and affection. They also provided an opportunity to become acquainted with an old mountaineer's field cuisine. And it was *not* the old mountaineer who developed acidosis from the monotonous diet

of pancakes and bacon, bannock and bacon, cheese and raisins, and rice and raisins!

During his last dozen years Butters was increasingly afflicted with illnesses—jaundice, diabetes, severe neuritis, and the arteriosclerosis which was the ultimate cause of his death. But his indomitable spirit brought him to the Herbarium in spite of these afflictions. Never a day passed until near the very end that he did not deliver his lectures on time and work on the specimens collected during preceding field seasons. Furthermore, he did not permit his physical condition to interfere with his field work except when the attacks were most severe. This strength of will was with him throughout his life and is well illustrated by a story from the early days which he and Rosendahl liked to tell on each other. They were out on Cowichan Lake on Vancouver Island while collecting in the early 1900's. The wind had risen and the waves were breaking on the rocks on shore—they were in a fragile dugout canoe—and caution dictated a prompt retreat. But Butters had sighted a specimen of *Cornus Nuttallii* which he felt they should have. Rosendahl objected. But Butters would say in telling the story, "That specimen is in the Herbarium today! You see *I* was steering!"

It is difficult to refrain from quoting a very graphic description of Dr. Butters which is incorporated in the following bit of doggerel composed about him by one of his students. It was presented as part of the program at the dinner given for Professor and Mrs. Rosendahl on the occasion of Professor Rosendahl becoming Professor Emeritus. Butters, of course, was Master of Ceremonies.

"Professor Butters

Beside a cluttered desk I sit
Mid books and paper piled high
My jaws clamped on a cigarette
Which sprinkles ash on coat and tie.

Leisurely I turn the pages
Of a book I know by heart
For the wisdom of the sages
It's my duty to impart."

Much could be said of Butters' interest in his Faculty Dining Club and the breadth of subject matter covered in his talks

before the members; of his interest in the origin and development of the Campus Club (the faculty club at the University of Minnesota); of his broad circle of acquaintances on the faculty; and of his loyalty to old and new friends and students. To elaborate on these subjects would but provide further examples of his wisdom and urbanity, of his virtues and perhaps of some of his foibles, of his uncompromising support of what he knew to be right and good, and of his philosophical cast of mind. His friends, who are many, know these things, and know, too, that his loss has been a deep one for them and for Botany.

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[1] Assistance in the preparation of this bibliography has been given by C. O. Rosendahl, Mrs. G. Forsberg, E. C. Abbe, E. B. Fischer, N. L. Huff, P. O. Johnson, L. I. Smith, and C. E. Smyithe, all of the University of Minnesota, C. W. Horton of Dartmouth College, and J. Afflerbach of the Cooperative Test Service of the American Council on Education.

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DEPARTMENT OF BOTANY, UNIVERSITY OF MINNESOTA

VICIA SEPIUM L. IN CANADA.[1]—In RHODORA **49**: 288. 1947, Herbert Habeeb reports *Vicia sepium* L. present in the province of New Brunswick, Canada. The present would seem an opportune time to bring together all the Canadian citations available. An earlier review not widely distributed (GROH, HERBERT. Canadian Weed Survey, Second Report, 1943. Mimeographed 1944) was not so complete as the present one.

NOVA SCOTIA: Annapolis Royal, 1921, *Fernald et al*, border of field (Can). PRINCE EDWARD ISLAND: Charlottetown, 1929, *Groh*, fencerow (DAO). NEW BRUNSWICK: St. Stephen, 1926, *Groh* (DAO); St. John, 1926, *Groh* (DAO, Can); St. John, 1930, *Groh* (DAO); East St. John, 1937, *Groh* (DAO); Grand Falls, 1947, *Habeeb* (Gray, as reported above). QUEBEC: Montreal, 1895, *L. R. Jones* (Gray, as reported, RHODORA **2**: 225. 1900). ONTARIO: west of Hamilton, 1895, *J. M. Dickson*, ravine (Can); Lambton Co., Ont., (as reported, Dodge, C. K., in Ann. Rep. Mich. Acad. Sci. 1915).

The herbaria above, besides the Gray, are the National Herbarium of Canada, Ottawa (Can), and the Division of Botany and Plant Pathology, Department of Agriculture, Ottawa (DAO).—HERBERT GROH, Division of Botany and Plant Pathology, Central Experimental Farm, Ottawa, Canada.

[1] Contribution No. 933 from the Division of Botany and Plant Pathology, Science Service, Dominion Department of Agriculture, Ottawa, Ontario, Canada.

Some minor Forms of Rosa.—In working over the species of *Rosa* in eastern North America I find myself looking upon some plants, which have been published as true species or varieties, as minor forms. Those which demand new combinations are the following:

Rosa setigera Michx., var. tomentosa Torr. & Gray, forma **serena** (Palmer & Steyermark), stat. nov. Var. *serena* Palmer & Steyermark in Ann. Mo. Bot. Gard. xxii. 569 (1935).

On the same page Palmer & Steyermark treated the unarmed glabrous-leaved *Rosa setigera* as a form, forma *inermis* Palmer & Steyermark, l. c., while the unarmed shrub with dull leaflets tomentose beneath was called a variety because "It appears to be more distinct and constant in its distinguishing characters, as well as more isolated geographically, than the variety based solely on the more or less pubescent character of the leaves". Since, however, unarmed or essentially unarmed shrubs with the foliage of var. *tomentosa* occur far outside "the Ozark region", in Ohio, Indiana, Alabama, etc., the geographic isolation seems less pronounced and the rose which is serene in having no prickles seems to be a form parallel with forma *inermis*, which in the Gray Herbarium is represented chiefly from Ozark Co., Missouri.

R. virginiana Mill., forma **nanella** (Rydb.), stat. nov. *R. nanella* Rydb. in N. Am. Fl. xxii[6]. 497 (1918).

Surely *Rosa nanella* is only the most stunted and rather xerophytic extreme of *R. virginiana*. It occurs on wind-swept crests, barrens, talus and sand-dunes from eastern Newfoundland south in the coastwise area to New Jersey, but I find no morphological character to separate it from the taller and larger *R. virginiana*.

R. carolina L., forma **glandulosa** (Crépin), stat. nov. *R. parviflora* Ehrh., var. β. *glandulosa* Crépin in Bull. Soc. Bot. Belg. xv. 68 (1876).

Plants with more or less glandular teeth or with glands on the leaf-rachis occur occasionally throughout the broad area of glandless typical *Rosa carolina*, from New England to southern Ontario and southward. They seem to have no distinctive range, and the number of glands on the foliage is thoroughly inconstant. There seems no justification for treating it as a species, as is done by Rydberg in N. Am. Fl. l. c. 500 (1918) and none for his calling

this species *R. serrulata* Raf. As characterized by Rydberg *R. serrulata* is said to have "Leaflets glandular-dentate and usually glandular on the rachis. Branches not bristly or rarely slightly so; teeth of the leaflets ovate" (Key, p. 484), "stipules . . . strongly glandular-ciliate . . . ; petioles and rachis glandular-hispid . . . ; leaflets . . . lance-elliptic or rarely oval . . . , with gland-tipped teeth". How very different was the account of *R. serrulata* Raf. in Ann. Gén. Sci. Phys. v. 218 (1820), repr. as Prodr. Monog. Rosiers, 9 (1820):

> 23. *Rosa serrulata.* Raf. Tige et pétioles aiguillonés et hispidules, aiguillons stipulaires droits, stipules ciliées; folioles 5-7, obovées, serretées et serrulées, glabres, pâles en dessous; fleurs 1–3, calices hispides, sépales simples serrulés: fruits globuleux hispidules. Var. *rotundifolia.* Aiguillons menus, droits et nombreux; folioles ovales, arrondies, base entière.
>
> Obs. Arbuste d'un pied; dans les bois avec le précédent, à fleurs roses peu odorantes, médiocres, pétales à peine échancrés. Les dents des feuilles sont serrulées. La variété croît en Kentuky; c'est peut-être une espèce distincte.

Surely Rafinesque would have detected the glands and he would not have called the leaflets "obovées" if they were "lance-elliptic or rarely oval". As to Crépin's *R. parviflora*, var. *glandulosa*, his description was clear: "à dents plus ou moins composées-glanduleuses". Crépin cited no type but several characteristic sheets in the Gray Herbarium bear his annotations made in 1896, "*Rosa humilis* Dents composées-glanduleuses", he then recognizing it as an unnamed form of *R. humilis* Marsh. (1785) = *R. carolina* L. (1753).

R. BLANDA Ait., forma **alba** (Schuette), stat. nov. Var. *alba* Schuette ex Erlanson in Papers Mich. Acad. Sci. v. 88 (1926).

A frequent albino, but certainly a mere color-form, not a geographic variety.

One of the most remarkable of roses only recently described is *Rosa Rousseauiorum* Boivin in Naturaliste Canadien, lxxii. 225 (1945), the third very characteristic species endemic to the area centering on the lower River and the Gulf of St. Lawrence, the new one strongly marked by its very large and dilated stipules (2–3.5 cm. long) bordered by crowded red stipitate glands so that the teeth often appear glandular-pectinate, the sepals 1.8–2.5 cm. long. The earliest collections cited for this endemic of the

lower St. Lawrence were made in 1927. It is, therefore, worth noting that among the accumulation of "unidentified" roses in the Gray Herbarium there is a very characteristic specimen from "Canada, Herb. Shepard", with Crépin's note "*R. blanda* Ait. var. à dents composées-glanduleuses". What Crépin could not have known from this very old specimen (just in bud) is the fact that in maturity the sepals would have become reflexed against the fruit, the very striking character which distinguishes this species, *R. Williamsii* Fernald and *R. johannensis* Fernald from *R. blanda*, in which the sepals form a porrect beak at summit of the fruit. Since this specimen came from "Herb. Shepard" it is probable that John Shepard received it from Frederic Pursh, who explored the lower St. Lawrence.—M. L. Fernald.

Juglans nigra oblonga in Missouri.—Mr. John T. Woodruff, Pinebrook Farms on Highway 14, Siloam Springs, Howell County, Missouri, has sent to the U. S. Forest Service a few fruits from a black walnut tree on his premises in which and its progeny he has taken much interest. The parent tree was discovered by him in 1934 as "a likely sprout some distance from any other walnut tree." The fruits and relatively rather thin-shelled nuts are distinctly oblong and definitely appear to be forma *oblonga* (Marsh.) Fern. (Rhodora **39:** 334. 1937), which Fernald & Long collected on the banks of the Meherrin River, Southampton County, Virginia, and noted as "The rare form which was described in 1785 by Humphrey Marshall as '*Juglans nigra oblonga. Black oblong fruited walnut.*'"

Sargent indicates in both his Silva and Manual that black walnut fruits are sometimes oblong but does not differentiate the form by name, range or in any other way. Nor do other publications on black walnut, so far as I have observed. The form may be close to the hort. var. stabler, the original of which was discovered by Henry Stabler on the Prebe Brothers' farm in Howard County, Maryland. In F. S. Baker's "Black walnut—its growth and management" (U. S. Dept. Agr. Bul. 933. 1921) Missouri, Illinois and Ohio form the bulk of the "primary commercial range" of this species, *i. e.*, as timber (see map, p. 2).—William A. Dayton, U. S. Forest Service.

Two Forms in Euphorbia.—

Euphorbia Ipecacuanhae L., forma **linearis** (Moldenke), comb. nov. *Tithymalopsis Ipecacuanhae* (L.) Small, f. *linearis* Moldenke in Phytologia, ii. 321 (1947). *E. gracilis* Ell. Sk. ii. 657 (1824). *Vallaris Ipecacuanha* Raf., var. *linearifolia* Raf. Aut. Bot. 96 (1840).

It is perhaps futile to give names to the many variations of leaf-outline and color in *Euphorbia Ipecacuanhae* but the extreme with linear leaves is possibly more definite than those with oblong, oval or obovate blades. At least on one of our Virginia trips Mr. Bayard Long and I collected in the same habitat plants with leaves of various outlines and color. When these were dried between ventilators and on a hot, sunny roof, the linear-leaves plants were thoroughly dry in a couple of days; those with broader leaves required a full week. This seemed to indicate that the former are less succulent than the latter. Incidentally, Elliott went so far as to treat the linear-leaved form as a distinct species. If anyone is seeking names for the plants with other leaf-outlines he can find them in the writings of Rafinesque.

E. dentata Michx., forma **cuphosperma** (Engelm.), stat. nov. *E. dentata*, var. *cuphosperma* Engelm. Bot. Mex. Bound. Surv. 190 (1859). *E. cuphosperma* Boiss. in DC. Prodr. xv^2. 73 (1862). *Poinsettia cuphosperma* Small, Fl. Se. U. S. 721 (1903).

Although in its extreme development the linear- or narrowly lanceolate-leaved form is striking, it seems to be only a form, for the transition to broad-leaved plants is gradual and the distinction in the seed completely fails.—M. L. Fernald.

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CELTIS OCCIDENTALIS L.: FIG. 1, TYPE, × ½.
C. CRASSIFOLIA Lam.: FIG. 2, TYPE, × ½.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. CLXVII

STUDIES OF AMERICAN TYPES IN BRITISH HERBARIA

M. L. Fernald and Bernice G. Schubert

(Plates 1097–1117)

Part I. Prefatory Notes by Dr. Schubert

In the early spring of 1945, when the work on the new edition of Gray's Manual had progressed to the point where only problems remained, Professor Fernald spoke occasionally of the necessity of having photographs of many of the type-specimens in British herbaria. In May of that year, shortly after V-E Day, he suggested that perhaps I could go to Britain when the war ended; and in August, during the two-day holiday proclaimed after V-J Day, he began to form a definite plan. In the winter of 1945–46, after being assured in correspondence with botanical colleagues at the British Museum (Natural History) and at Kew that their specimens might be returned from wartime sanctuaries and in working order by May, although other conditions might not be favorable, the likelihood of the project seemed less remote. The passage of three years since the beginning of preparations have now made the difficulties of the period from March, 1946, to the end of October, when I finally embarked on the Queen Elizabeth, seem much less enormous. A pleasant haze has settled over what seemed at the time very grim circumstances, surely not to be forgotten so soon. The really

outstanding recollection now is of the help very generously given us by friends[1] of the Gray Herbarium and by the members of the staff.

The strictly technical problems of camera and equipment had of necessity to be worked out in great detail because the possibility of buying anything at all abroad was not to be considered. With the aid and ingenuity of Dr. Ian D. Clement, then a graduate student very recently returned from service in Britain, this particular set of problems was worked out with sufficient care so that, with only minor modifications after arrival at the British Museum, the work was carried out as planned with no loss of negatives. The equipment, though simple, was designed with several considerations in mind, among them need for the least possible weight and probable lack of special lighting equipment and dark-room. We decided that the most portable case for carrying all the equipment would be a standard size student's laundry-case, which, after the camera, a Voigtlander Avus, $2\frac{1}{4} \times 3\frac{1}{4}$, was our first acquisition. With the inside measurements of the case at hand Dr. Clement proceeded to design a copying stand which could be used at one limit to photograph whole specimens (at $\frac{1}{5}$ natural size) and at the other to photograph details at natural size. Built in the University workshop, the extendable vertical rack was attached to the base by bolts and wing-nuts and the two portions of the rack were similarly joined, but the whole stand could be separated and packed with enough room left for film, film-holders, change-bag, notes, etc. The completely full case, with sufficient equipment for taking approximately one thousand specialized photographs (including all needs except lights), weighed 38 pounds, a not impossible load and one with sufficient padding in the form of "lab-coat" and kleenex to withstand the rigors of travel.

While the camera-stand was being constructed my occupations were many: trying to procure passage, finding film in quantity, copying descriptions of all the species to be studied and, in general, getting ready for a trip which might begin in May of 1946 or a year from then.

A passport was not received until late in June and then the

[1] Particularly the financial aid from Miss Edith Scamman, Mr. Walter D. Edmonds and Mr. Philip Wrenn.

vicious circle of "no visa, no passage; no passage, no visa" was run around for about two months until the British Consul, by this time probably a little tired of my frequent calls, said if all haste were made I could probably get passage on the Queen Elizabeth and if I did he would assume the responsibility of giving me a visa. Finally on the 28th of October, with too much luggage and a full sheaf of documents, I embarked on the beautifully refinished Cunarder in a state of complete exhaustion and great uncertainty. I do not know what I expected that distracted me to the point of leaving one piece of baggage in Customs at Southampton and the case with *all* my notes on the train at Waterloo Station (both of which, thanks to British efficiency, were very soon recovered) but my equilibrium returned promptly on reaching the British Museum in South Kensington.

The complete friendliness with which I was received by the Keeper of the Botany Department and his staff was very reassuring and the amount of help given me, particularly by Dr. George Taylor, immeasurable. For some weeks before my arrival Dr. Taylor, the Deputy Keeper, and his assistant, Mr. L. H. J. Williams, had worked from lists sent earlier, to get out a large number of the specimens I needed (since the Herbarium was not yet rearranged in actual working order). This meant a great saving in time and made it possible to start photographing immediately.

As Dr. Clement and I had expected, an unforeseen problem arose at once—the herbarium-sheets at the British Museum are considerably larger than the standard size in American herbaria. This required certain rearrangements but there was enough leeway in the rack so that the difficulty was satisfactorily overcome. The matter of lighting which had somewhat concerned us offered no particular problem and three (or sometimes only two) ordinary desk-lamps provided sufficient light.

During my six continuous weeks at the British Museum I took some 400 photographs of about 300 specimens in addition to the Walter Herbarium, photographed in its entirety and described in detail later in this paper. In the problems of photography particularly, Mr. James A. Crabbe of the technical staff was especially helpful and encouraging.

In many historical and bibliographical as well as taxonomic

questions Mr. A. H. G. Alston took particular pains to assist me. He also arranged a visit to the Chelsea Physic Garden, once in the charge of Philip Miller, many of whose types I was studying.

Both space and time prohibit my writing in any more detail of my stay at the British Museum. Although the larger amount of material needed was there, important types were also at Kew and in the middle of December I started working there, although, because of the acute housing shortage, I continued to live in South Kensington (on the tiny but well protected street on which Mr. Winston Churchill resides).

At Kew (where in contrast to the British Museum there was essentially no war-damage) I felt very much at home and it was obvious that the basic plans for the Gray Herbarium building were adapted from this splendid herbarium. The Keeper, Dr. Turrill, Mr. Sandwith in charge of American plants, Mr. Summerhayes in charge of *Orchidaceae*, and many others helped me to make rapid progress and do as much as possible in my limited time. The technical problems, solved in South Kensington, were no longer of any consequence. At Kew, in addition to studies of the North American types, it was also possible to photograph, though not study, types in many Central and South American genera in which my colleagues and I had special interest. In all I made just over 100 photographs at Kew and settled several bibliographical questions. Before Christmas too, I made a hurried trip to Cambridge to see some of Lindley's material (all preserved there but the *Orchidaceae*). Through the kindness of Dr. F. T. Brooks of the Botany School and the cordial assistance of Dr. J. G. Hawkes of the Imperial Institute of Genetics and Plant Breeding, my stay was made most interesting and profitable. A short visit with Mrs. Agnes Arber, who has done outstanding work, especially on the Monocots, was a very pleasant occasion in Cambridge too, planned for me by Mr. W. T. Stearn of the Royal Horticultural Society.

By the first of January, 1947, the period allotted for the project had passed but some summer vacation-time not used in 1946, made possible a short trip to Geneva and then a few days in London to study at the herbarium of the Linnean Society before departure.

My purpose in Geneva was chiefly to photograph DeCandolle's

types in *Begonia* and *Desmodium*, kept separately there, in the order of the Prodromus. In a very short two weeks it was possible only to photograph the specimens (about 200), take very brief notes and make a firm resolve to return really to study more of the fascinating material and to become better acquainted with Geneva, a particularly interesting city historically (to say nothing of its very numerous wonderful book-shops). My stay in Geneva was made especially pleasant by the help of Dr. Baehni, Director of the Conservatoire et Jardin Botaniques, and the Secretary-librarian, Mlle. Nelly Dubugnon, who wrote innumerable notes in French, to ensure my not getting lost, and performed many other kind services. It was most interesting also to meet in Geneva Dr. Hochreutiner, former director of the Conservatoire, a most gracious gentleman, and Dr. J. C. Willis of "Age and Area" fame, then putting the final touches on a new work.

Returning to London in the last week of January, it was necessary to close off some unfinished bits at the British Museum, collect my negatives, which the officers of the Museum had kindly arranged to have developed for me, and to spend a few days at the Linnean Society of London. The devoted Assistant-Secretary of the Society, Mr. Spencer Savage, made working there a most interesting and stimulating experience, and the privilege of working on the herbarium as well as Linnaeus' own books, with his annotations, was a very great one.

My departure from London was made at the time of the beginning of one of the most severe winters there recorded. The low temperatures, plus the restrictions in use of electricity and fuel imposed soon thereafter, would have made photography impossible; so, although my time was all too short, an extension then would not have greatly helped.

It is quite impossible here to express adequately the real significance of this short journey to a few of the older, historical botanical collections abroad. Those who helped, here named and unnamed, both botanists and others of whom there were very many, have made a positive contribution to the accuracy and authenticity of the new edition of Gray's Manual. To all these friends this brief note is a small token of my appreciation and the gratitude of the senior author, Professor Fernald, and myself.

PART II. SOME LINNAEAN SPECIES (PLATES 1097–1102)

PTERIS ATROPURPUREA L. Sp. Pl. ii. 1076 (1753). The specimen so marked in the Linnaean Herbarium is the plant currently interpreted as that species. The first sentence in the Linnaean description might or might not refer to this plant. The Gronovian diagnosis seems to refer to *Pellaea glabella* Mett., but the Gronovian collection is not available. Since Linnaeus's specimen, annotated by him, is the pubescent plant, *P. atropurpurea* of authors generally, it is best not to disturb the present concept. Linnaeus's "stipes nitidus" does not hold for this plant.

POTAMOGETON PUSILLUS L. = *P. panormitanus* Bivona-Bernardi, var. *major* G. Fischer. As pointed out in RHODORA xlii. 246 (1940) Dandy and Taylor indicated (in Journ. Bot. lxxvi. 91 (1938)) that the TYPE of *Potamogeton pusillus* L. Sp. Pl. i. 127 (1753) has been regularly misinterpreted and that it is actually the later published *P. panormitanus* Biv. Nuove Piante ined. Barone Ant. Biv.-Bern. pub. del Figlio Andrea, 6 (1838). They did not make any differentiation between the two varieties of *P. panormitanus* which in America, at least, are very definite: var. *major* G. Fischer, Berichte Bayer. Bot. Gesells. xi. 109 (1907), and var. *minor* Biv. l. c. The former, with the larger or primary leaves 1–3 mm. wide, was illustrated in Fernald, Mem. Gray Herb. iii. pls. ix, xxix, fig. 7, xxxiii, fig. 4 and xxxix, fig. 10 (1932). The latter, with the larger leaves only 0.3–1 mm. wide and relatively short, was illustrated (Fernald l. c.) in plates x, xxix, fig. 8 and xxxiii, fig. 5. Until it could be determined which of these plants is matched by the Linnaean type of *P. pusillus* it was inadvisable to transfer either of the varietal names. It is now established that the TYPE of *P. pusillus* is identical with *P. panormitanus* var. *major;* this necessitates the new combination:

P. PUSILLUS L., var. **minor** (Biv.) comb. nov. *P. panormitanus* Biv. var. *minor* l. c.; Gussoni, Fl. Sic. Syn. i. 207 (1842); G. Fischer l. c.

ANDROPOGON ISCHAEMUM L. Sp. Pl. ii. 1047 (1753). The plant which Linnaeus labeled "11 Ischaemum" is *A. Gerardi* Vitm. (*A. provinciale* Lam. non Retz.), native in North America and cultivated and probably escaped in southern France. *A. Ischaemum,* as described and generally understood, is a wholly

different species, native to central and southeastern Europe, Asia and Africa and is the plant to which all the references cited by Linnaeus apply. The identity of *A. Gerardi* was discussed in Rhodora xlv. 255 et seq. (1943).

Cyperus alternifolius L. Mant. 28 (1767), "*Habitat in* Virginia." Cited by C. B. Clarke in Journ. Linn. Soc. xxi. 130 (1884) in his paper *On Indian Species of Cyperus* with the range given as "Madagascar". There seems to be no question about the identity of the plant, which is not known in America.

Juncus nodosus L. Sp. Pl. ed. 2, 466 (1762). The material under this name is as mixed as were Linnaeus's bibliographical citations. The two specimens marked by Linnaeus as *J. nodosus* are (1) characteristic *J. scirpoides* Michx. (specimen no. 449.16) and (2) the little stoloniferous northern plant which regularly passes as *J. nodosus* (specimen no. 449.17). By some of the early authors *J. nodosus* was taken up in the sense of *J. scirpoides* and the latter cited as a synonym. Since, however, the brief diagnosis applies better to the second plant (no. 449.17), which for more than a century has been regularly treated as *J. nodosus*, it would be superfluous to interpret the species as intended primarily for *J. scirpoides*.

The Type of Celtis occidentalis L., our plates 1097, 1098. —*Celtis occidentalis*, one of the most variable and taxonomically difficult of species, was defined by Linnaeus, Sp. Pl. ii. 1044 (1753), as follows:

> *occidentalis.* 3. CELTIS foliis oblique ovatis serratis acuminatis.
> Celtis procera, foliis ovato-lanceolatis serratis, fructu pullo. *Gron. virg.* 195.
> Lotus arbor virginiana, fructu rubro. *Raj. hist.* 1917.
> *Habitat in* Virginia. ♄
> Folia *tenera, ovato-lanceolata, parum pubescentia; adulta lato-ovata, acuminata, acumine & basi integerrima, ceterum serrata, nuda, nervoso-venosa, latere postico duplo minore.*

It will at once be noted that in the four-line new description by Linnaeus he obviously had two quite different plants confused: (1) "Folia *tenera, ovato-lanceolata, parum pubescentia*"; (2) "*adulta lato-ovata, acuminata, acumine & basi integerrima, ceterum serrata, nuda, nervoso-venosa, latere postico duplo minore*". Furthermore, the quotation from Ray said "fructu rubro"; that

from Gronovius, which obviously coincided with the first part of the longer Linnaean description with "foliis ovato-lanceolatis", had "fructu pullo".

Recent interpretation of *C. occidentalis* and its varieties started with Sargent in Bot. Gaz. lxvii. 217, 218 (1919). There Sargent gave the following definitions.

> CELTIS OCCIDENTALIS L.—"On what is usually considered the type of this species the leaves are broadly ovate, acute or short-acuminate at apex, obliquely rounded at base, coarsely or finely serrate, smooth on the upper surface, glabrous or sparingly pilose along the midribs and veins below, thin, not conspicuously venulose; petioles glabrous or rarely puberulous. The fruit is borne on glabrous or rarely puberulous pedicels much longer than the petioles and is subglobose, ellipsoidal, or slightly obovoid, and 9–10 mm. in diameter; the stone is only slightly reticulate. The branchlets are glabrous or occasionally pubescent."
>
> Var. CANINA.—". . . Differing from the type in the usually narrower long-acuminate leaves.
>
> "Extreme forms of this variety look very distinct, but trees with leaves intermediate between these and those of the typical form are common. The fruit varies as in the type from subglobose to obovoid, and there seems little difference in the length of the pedicels, which are always longer than the petioles. The leaves are usually glabrous, but on some of *Bush's* Missouri specimens the midribs and veins are pilose on the lower surface and the petioles are pubescent, as in the variety *crassifolia* . . . "
>
> "Var. CRASSIFOLIA Gray, Man. ed. 2, 397. 1856.—*C. crassifolia* Lamarck, Encycl. Meth. **4:** 138. 1797.—Differing from the type in its usually narrower, acuminate, thicker leaves, often more coarsely serrate or nearly entire, scabrate on the upper surface and pilose below along the midribs and veins.
>
> "In this form the petioles are usually villose-pubescent, but occasionally are quite glabrous; the pedicels are slightly villose, and the branchlets are glabrous or pubescent."

At the same time Sargent took up for the tree of the southern Coastal Plain, which extends northward abundantly to the James River and inland northward in the Mississippi basin, the name *C. laevigata* Willd. of which, as Sargent said on his page 222,

> "when it grows under favorable conditions, is a tree sometimes 30 m. high, with somewhat pendulous branches and slender, glabrous, red-brown branchlets. The leaves are thin, usually oblong-lanceolate, long-pointed and acuminate at apex, unsymmetrically rounded and often oblique or cuneate at base, frequently more or less falcate, entire or furnished with a few teeth usually toward the apex, green on both surfaces, glabrous, smooth or occasionally scabrate above. The fruit is bright orange-red on pedicels shorter or slightly longer than the petioles."

Sargent recognized (p. 223) *C. laevigata*, var. *Smallii* (Beadle)

CELTIS PROCERA, FOLIIS OVATO-LANCEOLATIS SERRATIS, FRUCTU PULLO of Gronovius, cited by Linnaeus as a secondary element of his C. OCCIDENTALIS: FIG. 1, the Clayton (Gronovian) specimen, × ca. ½.

C. PUMILA Pursh: FIGS. 2 and 3, TYPE, × 5/7, courtesy of Messrs. *Pennell* and *Long*.

Sarg., in which the leaves of the fertile branchlets are constantly serrate, as well as some other variations of this often red-fruited species from farther to the southwest.

In his Manual (ed. 2) 318, 319 (1922), Sargent placed *C. occidentalis* with "fruit dark purple" under a heading "fruit on pedicels much longer than the petioles" and his fig. 289 thus illustrated it; while *C. laevigata* came under the general heading "fruit on pedicels shorter or only slightly longer than the petioles" the fruit being described as orange-color or yellow. The artist, however, showed the fruiting pedicels two or three times as long as the subtending petioles!

When the material which Linnaeus had before him is checked it is significant that the specimen, our PLATE 1097, FIG. 1, which he personally marked as species "3 K C. occidentalis", the specimen, collected by Kalm and now numbered in the Linnaean Herbarium 1209.4, has the fruiting pedicel scarcely as long as the petiole. This is the specimen which supplied the second portion of the Linnaean description, "*adulta lato-ovata*", etc. The citation from Ray with "fructu rubro" is not good for a species with purple-black fruit and may be passed as not typifying *C. occidentalis.*

The Gronovian account of "Celtis procera, foliis ovato-lanceolatis serratis, fructu pullo" is supported by a beautiful sheet in the Gronovian herbarium at the British Museum (our PLATE 1098, FIG. 1) which is clearly of *C. laevigata*, var. *Smallii*, a very characteristic tree which reaches its northern limit in Clayton's territory. This tree, with very thin oblong- or ovate-lanceolate, long-attenuate leaves, formed the basis of the first portion of the Linnaean description "Folia *tenera, ovato-lanceolata*". In the Linnaean Herbarium, but not bearing Linnaeus's identifications, there is a branch (1209.5) in anthesis (with one flower) the sheet bearing in Gronovius's hand "Celtis fol. ovato-lanceolatis", etc., but with the "fructu atro purpurascato subdulci". Since this specimen was not marked by Linnaeus and since most of its elongate leaves have the tips broken, it is of secondary importance, but the long-attenuate tips of the two unbroken upper leaves are readily matched by those of modern specimens of *C. laevigata*, var. *Smallii.* The Gronovian "fructu atro purpurascato" certainly was not deduced from the single

flower. At any rate, this specimen, without Linnaeus's identification, cannot be taken as the type of *Celtis occidentalis*. Since the one specimen which bears Linnaeus's identification and is certainly the basis of the description of the adult branch, while the far handsomer Clayton specimen of the tree "folia *tenera, ovato-lanceolata*" and the unidentified fragment in the Linnaean Herbarium are characteristic *C. laevigata*, var. *Smallii*, it seems only right to treat the first (1209.4) as the TYPE of *Celtis occidentalis*. This decision coincides with that of Mr. Savage in a letter to us, under date of 30 May, 1947, which refers unequivocally to "The type-specimen of *Celtis occidentalis* L. in Hb. Linn. no. 1209.4".

At the time the junior author made the photographs of *Celtis* in the Linnaean Herbarium the severe winter of 1946–47 was coming on in London and the resulting numbness of fingers made it impossible to ascertain clearly whether the leaves of 1209.4 were smooth or scabrous. This point is now settled for us in Mr. Savage's letter, written when the weather in London was "almost unbearably hot", Mr. Savage stating explicitly that "the leaves of this specimen are scabrous". The type of *Celtis occidentalis* is, then, as already surmised, identical with *C. crassifolia* Lam., Encycl. Méth. iv. 138 (1796), Lamarck's TYPE shown as our PLATE 1097, FIG. 2.

The thin- and smooth-leaved tree or shrub which has recently been passing as true *C. occidentalis* must be called *C. occidentalis*, var. *pumila* (Pursh) Gray, Man. ed. 2: 397 (1856), for this was based on *C. pumila* Pursh, Fl. Am. Sept. i. 200 (1814). This interpretation of *Celtis pumila* needs explanation, since, by the treatments of Sargent, Rehder and their followers, *C. pumila* is supposed to be the shrub or small tree of exposed or very bleak habitats with the leaves of the fertile branchlets entire or essentially so and the small and spherical fruits bright red or reddish to brown and with relatively small stones, whereas the fruit of the serrate-leaved and mostly taller *C. occidentalis* is larger, slightly longer than broad to spherical, and varying in the different trends from orange or amber-color to purple-black, the stones positively larger than in so-called *C. pumila*. The generally accepted but erroneous interpretation is well stated in the key and description in Rehder, Man. Cult. Trees and Shrubs, ed.

2: 184, 185 (1940). His *C. pumila* there comes under the first capital A of his key, "Leaves entire or occasionally with few teeth . . . : stone pitted", while *C. occidentalis* comes under AA "Leaves serrate". His *C. pumila* has its fruit described as "purple or tan-color". Deam's Flora of Indiana (1940), based upon a very close field-study of the plants of his region, thus separates *C. occidentalis* and the traditional *C. pumila.* In his key on page 392 the following is given for *C. occidentalis:*

> Margins of leaves of fruiting branchlets and shoots sharply serrate all around to the base; leaf blades of an ovate to broadly ovate type, oblique at base, sometimes strongly so, those of fruiting branchlets 5–15 cm long; pedicels of fruit much longer than the petioles; nutlets 6–8 mm long; small or large trees.

This opposed to

> Margins of leaves of fruiting branchlets usually entire, or some with a few teeth on one side or with a few teeth on both sides but never serrate on either side to the base; margins of leaves of vegetative branchlets and shoots similar to those of fruiting branchlets, or with the margins serrate nearly all around but never serrate to the base; pedicels of fruit shorter or only slightly longer than the petioles; nutlets 5–6 mm long,

this definition covering both *C. laevigata* and *C. pumila.* The latter is separated by Deam as follows:

> Leaves mostly of an ovate-lanceolate type, sometimes ovate to broadly ovate or rarely oblong-lanceolate, generally thick and yellow green beneath, generally smooth but sometimes rough above; blades extremely variable in size and shape, mostly 3–10 cm long and 2–6 cm wide, usually about half the maximum size; branchlets usually more or less pubescent; pedicels shorter or longer than the petioles; mature fruit (collected in October) a dark cherry red; trees usually 1–2.5 m high, but sometimes 4–6 m high and up to 1 dm in diameter near the base; of a dry sandy, gravelly or rocky habitat.

Deam's very detailed description is of *C. pumila* as nowadays generally interpreted. Unfortunately, however, recent authors seem not to have paid very close attention to Pursh's own account. Otherwise they would not emphasize the entire leaves and the small and spherical purple or tan-color or cherry-red drupe. As a matter of fact, wherever the senior author has seen the entire-leaved so-called *C. pumila* its small spherical fruits have always been red to red-orange when ripe. Pursh's brief account was as follows:

> *pumila.* 3. C. foliis ovatis acuminatis aequaliter serratis basi inaequalibus utrinque glabriusculis: junioribus tantum pubescentibus, pedunculis subtrifloris, fructu solitario.

On the banks of rivers: Maryland and Virginia. ♄ . May. *v. v.* A small straggling bush; berries ovate, black.

The small to medium-sized tree or shrub with relatively thin and smooth serrate leaves, which has passed as true *C. occidentalis*, is obviously what Pursh described. Fortunately Pursh's own material (the TYPE), with his own identification clearly written, is preserved in the Pursh herbarium at the Academy of Natural Sciences of Philadelphia. We are indebted to the generous interest of Mr. Bayard Long for a photograph of it, $\times {}^{5}/_{7}$ (PLATE 1098, FIGS. 2 and 3) and to Dr. Francis W. Pennell for a transcript of the label, Dr. Pennell remarking that Pursh's labels are the most complete of any on old collections preserved at the Academy. Pursh collected this specimen "in 1806 on his Virginia trip made for Dr. B. S. Barton".

The shrub or small tree of usually exposed habitats which has erroneously been passing as *Celtis pumila* is *C. tenuifolia* Nutt. Gen. N. Am. Pl. i. 202 (1818). Although Nuttall thought his new species might be the *C. pumila* of Pursh, he definitely expressed doubt. His new name was not, then, a superfluous substitute but that of the shrub which erroneously passes as *C. pumila*. Here is Nuttall's description:

3. *tenuifolia*. *C. pumila*, Pursh 1. p. 200? A low bush, in the mountains of Virginia, flowering at the height of 2 feet. Leaves nearly as broad as long, now and then without serratures, often cordate-ovate, very little acuminated and almost perfectly smooth on both sides. Berries solitary, brown and glaucous.

The extreme with leaves thicker, more pubescent, and harshly scabrous above is:

C. TENUIFOLIA Nutt., var. **georgiana** (Small), comb. nov. *C. georgiana* Small in Bull, Torr. Bot. Cl. xxiv. 439 (1897). *C. pumila*, var. *georgiana* (Small) Sargent in Bot. Gaz. lxvii. 227 (1919).

In some cases, as in the work of Deam, we find *Celtis pumila* ascribed to "(Muhl.) Pursh"; in others called *C. occidentalis*, var. *pumila* Muhl. The evident basis for such citations is the *nomen nudum* "*C.* occidentalis, B, pumila dwarf Pens. fl. Maio." of Muhl. Cat. 95 (1813). Without any differentiation, the word "dwarf" being a mere translation of "pumila", Muhlenberg's name must be treated as a *nomen nudum*.

Polygala cruciata L.: fig. 1, portion of plant, × 1, from west of Snead's, Jackson Co., Florida, *Wiegand & Manning*, no. 1735; fig. 2, portion of raceme, showing bracts, × 5, from no. 1735; fig. 3, seeds, × 10, from Duval Co., Florida, *Curtiss*, no. 509.

Another name which may sometime have to be taken up is that of Persoon, Syn. i. 292 (1805), his *C. occidentalis* "β.? *tenuifolia*, fol. tenuioribus minus acuminatis, dentib. majoribus basi magis rotundatis; vid. Enc. bot. l. c. p. 137 et 138. Cresc. in Ludoviscana; colitur in H. P. An distincta?". This is based on *C. occidentalis* "β. *eadem? foliis tenuioribus minùs acuminatis*" of Lam. Encycl. Méth. iv. 137 (1796). Lamarck further saying (p. 138):

> L'arbre β, dont je ne connois ni les fleurs ni les fruits, est originaire de la Louisiane, & cultivé également au jardin des plantes. Il a les feuilles moins acuminées, plus minces, dentées plus grossièrement, un peu plus arondies à la bâse. La gelée a d'ailleurs beaucoup de prise sur lui, & le fait ordinairement périr tous les ans jusqu' à la racine, au moins dans notre climat. N'est-il qu'une simple variété du *celtis occidentalis*, ou bien doit-il former une espèce particulière? (*V. v. 5. Flor. & 5. Fr.*)

It is not improbable that this variety may prove to be *C. laevigata* Willd., var. *Smallii* (Beadle) Sarg. l. c. 223 (1919). Until this matter is settled Sargent's varietal name should stand.

An early varietal name for typical *Celtis laevigata* Willd., the name to be taken up if entire-leaved typical *C. laevigata* is treated as a variety of *C. occidentalis* (a course for which there is logical argument, in view of the frequent overlapping of characters) is *C. occidentalis* L., var. *integrifolia* Nutt. Gen. i. 202 (1818). This varietal name was unjustifiably cited in the synonymy of *C. mississippiensis* Bosc ex Spach (1841) as "C. integrifolia, *Nutt.*" by Gray, Man. ed. 2: 397 (1856), thus unfortunately saddling upon Nuttall a binomial which he apparently did not make, Nuttall having used only the varietal combination. The only legitimately published *C. integrifolia* seems to be that of Lam. Encyc. Meth. iv. 140 (1796), with "*foliis ovato-subrotundis*" and coming from Senegal. Obviously this has nothing to do with *C. laevigata*, although *Index Kewensis*, with uncanny lack of understanding, refers it to the synonymy of the narrow-leaved American *C. mississippiensis* Bosc ex Spach (1841), a synonym of *C. laevigata* Willd. (1811). Even if the round-leaved *C. integrifolia* Lam. (1796) of Senegal were forced into the narrow-leaved *C. mississippiensis* of 1841 or *C. laevigata* of 1811 (reduced by Ind. Kew. to *C. mississippiensis*), it is not clear on what basis this indispensable but too often misleading work was com-

piled. *Celtis* was obviously as puzzling to its editors as to those who have to hunt for its morphological characters. Another name for entire-leaved typical *C. laevigata* Willd. (1811) is *C. longifolia* Nutt. N. Am. Sylva, i. 134, t. xl (1842), described in detail, beautifully illustrated and based on "*C. occidentalis* β. *integrifolia*, NUTT. Gen. Am. vol. 1. p. 202. (not of LAMARCK.)," Nuttall giving the tree a new name because of the earlier *C. integrifolia* Lam. (1796). Nuttall's *C. longifolia* has not made its way into Index Kewensis, presumably because it was thought to be the same as *C. longifolia* Raf. Atl. Journ. i. 177 (1833), a tree of "*Texas & Arkanzas*", which, from the description, "Fol. distichis, elongato oblongis acum. basi obliq. truncatis, equal. serratis" etc. was presumably *C. laevigata*, var. *Smallii*.

This discussion of nomenclatural and taxonomic problems is only typical of much which must be cleared before the exact names and identities of our plants (and especially the ligneous ones) can be finally settled. To the problem of evaluating the often fluctuating morphological characters is added the interpretation of authors of the past. The present authors do not deceive themselves into thinking that the problems of eastern American *Celtis* are finally settled. They may have done something to clear away some of the obstacles.

SALICORNIA VIRGINICA L. Sp. Pl. i. 4 (1753) as *virginia*. *S. herbacea*, β. *virginica* (L.) L. Sp. Pl. ed. 2: i. 5 (1762). *S. ambigua* Michx. Fl. Bor.-Am. i. 2 (1803).

Although Linnaeus confused the characteristic Atlantic North American perennial with a quite different plant of Europe, his brief diagnosis and his quoted description were both based on Virginian material from Clayton, described in Gronovius, Fl. Virg. ii. 129 (1743). The Gronovian account was clear and to the point:

> SALICORNIA *caulium ramorumque articulis apice bicornibus.*
> Salicornia erecta ramosa, caule ad imum nudo, plerumque rubente. *Clayt. n. 527 & 667.*

Linnaeus wrote

> *virginia.* 3. SALICORNIA articulis apice compressis emarginatis bifidis.
> Salicornia caulium ramorumque articulis apice bicornibus. *Gron. virg.* 129.
> *Habitat in* Virginia, *& ad* Salinas Saxoniae. ⊙

In Species Plantarum, ed. 2, i. 5 (1762) Linnaeus corrected the spelling of the name but reduced the Virginian species to varietal rank under the annual *S. herbacea* L. as *S. herbacea* β. *virginica*, giving merely the description from Gronovius but adding the comment: "*Virginica* β. *ad Salinas Saxoniae frequentissima, vix ac ne vix distincta est species; articuli in salsis enim magis emarginati evadunt.*"

Even though Linnaeus confused the quite different plant of Saxony with the plant described by Gronovius from Clayton specimens and erroneously inferred that the Clayton specimens were annual, the collection of Clayton, preserved in the Gronovian Herbarium at the British Museum of Natural History, must stand as the TYPE of *Salicornia virginica*, especially since Linnaeus had no material in his own herbarium. This Clayton sheet, bearing the brief diagnoses above quoted from Gronovius and the nos. 572 and 667 (the former evidently misquoted by Gronovius as 527), consists of three branches, two of them forking from below the middle and with very prominent 2-horned scales ("caulium ramorumque articulis apice bicornibus"), the third a long and simple stem with few simple branches at summit ("erecta ramosa, caule ad imum nudo"). This material is very readily matched by specimens of *S. ambigua* Michx., a species which Clayton would have had great difficulty in avoiding along the coastal sands of Virginia.

POLYGALA CRUCIATA L., var. **aquilonia,** var. nov., TAB. 1100, planta 0.5–2.5 dm. alta, simplex vel divergenter ramosa; foliae verticillis primariis 3–5 (–7), foliis spathulatis vel spathulato-linearibus; racemis sessilibus vel breviter pedunculatis (pedunculo ad 5 mm. longo) primariis 0.7–1.5 cm. crassis; bracteis persistentibus 1.5–2 mm. longis; alae late deltoideo-cordatae, quam latis quam longis, 2.5–4 mm. longis in apice subulato, 0.5–1 mm. longo; seminibus ellipsoideo-obovoideis rugulosis.—Southern Maine to Virginia, there passing to typical *P. cruciata;* inland from northern Ohio to northern Illinois and Minnesota south to mountains of Alabama and Tennessee. TYPE from inner edge of salt-marsh, Stratford, Connecticut, August 30, 1896, *E. H. Eames* in Herb. Gray.

In general, botanists have interpreted the more northern var. *aquilonia* as true *Polygala cruciata*, and the wide-ranging southern *P. cuspidata* Hook. & Arn. in Hook. Journ. Bot. i. 194 (1834), not DC. (1824), has been treated as a fairly distinct and larger

variety, *P. cruciata*, var. *cuspidata* (Hook. & Arn.) Wood, Class-bk. ed. of 1861: 296 (1861) or var. *ramosior* Nash ex Robinson in Gray, Syn. Fl. i[1]. 458 (1897). Small, furthermore, considered the latter a distinct species, *P. ramosior* (Nash) Small, Man. 771 (1933).

The Linnaean *Polygala cruciata*, Sp. Pl. 706 (1753), was based on two references, one of which, Gron. Virg. 80, contains a citation to a Clayton specimen, no. 157. This specimen, now in the British Museum, was examined and photographed. It consists of two depauperate plants with all the tendencies of the southern variety, although not quite approaching most such material in the size of its parts. Its leaves are linear-spatulate and its nodes numerous (for its size). On the same sheet with the Clayton collection is mounted a collection, also somewhat depauperate, from Maine. The latter plants show equally well the characteristics of var. *aquilonia*, with divergent branches and spatulate to narrowly oblanceolate leaves. The two collections could hardly be considered the same and better developed material makes clear that the tendencies here displayed, when fully developed, characterize real varieties. The Clayton material, immature though it is, unquestionably represents the more southern branch of the species, typical *P. cruciata*.

Although in eastern Virginia typical *Polygala cruciata* and var. *aquilonia* obviously merge, the material from Florida to eastern Texas, thence northward into eastern North Carolina (and largely eastern Virginia) seems to be well distinguished from the more northern series. The following characters may be noted:

P. CRUCIATA (typical), our PLATE 1099. *P. cuspidata* Hook. & Arn. in Hook. Journ. Bot. i. 194 (1834), not DC. (1824). Var. *cuspidata* (Hook. & Arn.) Wood, Class-bk., ed. of 1861: 296 (1861). Var. *ramosior* Nash ex Robinson in Gray, Syn. Fl. i[1]. 458 (1897). *P. ramosior* (Nash) Small, Man. 771 (1933). Plant 1–5 dm. high, simple to much branched, the primary axis with 5–12 leaf-bearing nodes; leaves linear-spatulate or linear-oblanceolate, firm, the larger ones 1.5–3 (–4) mm. wide; racemes sessile or on peduncles up to 4 cm. long, the leading raceme before falling off of lower flowers (1–) 1.5–4.5 cm. long and 1.2–2 cm. thick; persistent bracts 2–3 mm. long; wings longer than broad, their blades 3.5–5.5 mm. long, tapering to an awn 1.5–3 mm. long; seed ellipsoid, faintly rugulose.

Var. AQUILONIA, PLATE 1100. Plant 0.5–2.5 dm. high, simple or divergently few-branched, the primary axis with 3–5 (–6) leaf-bearing nodes; leaves spatulate to narrowly oblanceolate, herbaceous, the larger ones (2–) 3–7 mm. wide; racemes sessile or on very short (up to 5 mm.) peduncles, the leading raceme before falling of flowers 0.7–3.5 cm. long and 0.7–1.5 cm. thick; persistent bracts 1.5–2 mm. long; wings about as wide as long, 2.5–4 mm. long, with subulate tip 0.5–1 mm. long; seed ellipsoid-obovoid, coarsely rugulose.

POLYGALA CRUCIATA L., var. AQUILONIA Fernald & Schubert: FIG. 1, portion of TYPE-SHEET, × 1; FIG. 2, portion of raceme, showing bracts, × 5, from Centerville, Massachusetts, September 6, 1896, *E. F. Williams;* FIG. 3, seeds, × 10, from Wellfleet, Massachusetts, *Fernald & Long*, no. 17,037.

True southern *Polygala cruciata* seems never to occur in subsaline habitats but to prefer wet pineland or pine-barren or boggy savannas, Chapman, Fl. So. U. S. 84 (1860) assigning it to "Pine-barren swamps" and Small, Fl. to "Low pinelands and swamps". The 41 collections in the Gray Herbarium which have clear indication of habitat give the following score: moist pineland, pine-barren swamps or flat pineland, 14; savanna, sphagnous swale or sphagnous bog, 15; swamp, 3; meadow, 5; and moist soil, river-swamp, low ground and grass-palmetto land, 1 each. On the other hand the generally more northern or inland var. *aquilonia* is a plant of usually less saturatedly wet habitats and from Delaware northward it is partial to the outer coastal or coastwise region, even the upper borders of salt-marshes. Thus, in their report on the Flora of the Boston District, Knowlton and Deane recorded it in Rhodora xxi. 81 (1919) as "not reported from western towns, but occasional throughout the towns nearer the coast". In fact, of the 90 collections from Massachusetts before us the farthest inland is from Westford, only about 25 miles from the sea. Similarly, the Connecticut Botanical Society's Catalogue of the Flowering Plants and Ferns of Connecticut says: "Occasional or frequent near the coast, but rare or wanting inland". For the whole of New York state House could say only "In sandy swamps and depressions and the borders of salt marshes. Frequent or common on Long Island and Staten Island", not far inland. Again, Stone, reporting on the Plants of Southern New Jersey, says: "Common in damp ground in the Pine Barrens and locally in the Middle, Coast and Cape May districts, occurring at a few stations north of our limits, but all within the coastal plain". From the 70 collections before us from New England, which have the habitat clearly indicated, we get the following score: border of salt-marsh or sea-shore, 10; sandy, gravelly or peaty pond-margin, 31; meadow or low field, 13; cranberry-bog or boggy swale, 8; grassy swamp, damp sandy soil or sandy swamp, 2 each; dry field and damp woods, 1 each.

Farther inland (as in the case of many other coastwise species) var. *aquilonia* occurs near the Great Lakes, thence southward along the mountains to northern Alabama: swamps near Henderson, Henderson Co., North Carolina [between Blue Ridge and

Pisgah Ridge], *Biltmore Herb.* no. 731[d]; Pine Knot, McCreary Co., Kentucky [Pine Mts. to Cumberland Plateau], *H. J. Rogers*, no. 39; 6 miles east of Crossville, alt. 2300 ft., Cumberland Co., Tennessee (Cumberland Mts.), *Svenson*, no. 4181; Sand Mountain, Jackson Co., Alabama, August 29, 1938, *Lillian V. Porter*. Extending locally inland from the Gulf States true *P. cruciata* reaches south-central Tennessee: Coffee Co., alt. 1100 ft., *Svenson*, no. 4258; Van Buren Co., *Svenson*, no. 9391; Grundy Co., *Svenson*, no. 8930.

From Blake's synonymy in the North American Flora it might be thought that *Polygala missurica* Raf. New Fl. iv. 89 (1838) should be taken up for the inland phase of *P. cruciata*, var. *aquilonia;* but it is probable that there was some misinterpretation of Rafinesque's plant. On his pp. 87 and 88 Rafinesque subdivided *Polygala* into 10 subgenera, with sugbenus

> "5. Sexilia R. stamens 6 sessile, corolla bilabiate cristate, type P. verticillata and all whorled species, chiefly annuals".

His *P. missurica* was described as follows:

> "966. Polygala (Sexilia) missurica Raf. stem branched diffuse 4gone, leaves quaternate and opposite broad lanceolate smooth, base acute, end mucronate; spikes terminal oblong imbricate—in the prairies of Missouri and Illinois, 3 to 4 inches high, leaves larger and broader than in others, flowers white, not in filiform spikes. Annual".

Since subgenus *Sexilia* was typified by *Polygala verticillata* and the only additional species definitely named by Rafinesque in this place was his *P. missurica* with *lanceolate* (not oblanceolate nor spatulate) *leaves* and *white flowers* and since the ordinarily green- to bronze- or purple-flowered *P. cruciata* has never been recorded from Missouri (at least not recorded by Palmer & Steyermark), it would seem that Rafinesque was describing a white-flowered, lanceolate-leaved variety of *P. verticillata* with "spikes . . . oblong". Just such a plant is *P. verticillata*, var. *sphenostachya* Pennell in Bartonia, xiii. 9 and 12 (1931) which is represented by specimens before us from "sandy prairie", Havana, Illinois, *Gleason;* "sterile prairie", Stark Co., Illinois, *V. H. Chase*, no. 198; "prairies" Leeds, North Dakota, *Lunell;* "common on prairies", Black Hills, *Forwood;* and by material from Missouri. At least *P. missurica* can hardly be *P. cruciata.*

Ordinarily the racemes of var. *aquilonia* are greenish, reddish or purple-tinged. Very rarely an albino occurs. This is

Var. AQUILONIA, forma **alba** (Oakes), comb. nov. *P. cruciata* b. *alba* Oakes in Hovey's Mag. vii. 185 (1841).

HYPERICUM CALYCINUM L. Mant. 106 (1767). The habitat of this species was cited with doubt by Linnaeus as in America septentrionali. The species is, however, native in the Old World and the type-specimen is matched by a large amount of herbarium-material.

HYPERICUM PROLIFICUM L. l. c., our PLATE 1101, FIGS. 1–3. The material under this name in the Linnaean Herbarium was discussed in some detail by Svenson in RHODORA, xlii. 9 (1940). Svenson's decision that sheet no. 20 must be taken as the TYPE of *H. prolificum* L. is correct, as is his statement that sheets 22 (our FIG. 4), 23 and 24 represent *H. prolificum* in the sense of American authors generally, not Linnaeus (except in very small part, the Gronovian reference). In the original account Linnaeus included two very different plants:

prolificum. 31. HYPERICUM floribus trigynis, caule tetragono fruticoso, foliis lanceolato-linearibus, floribus primordialibus sessilibus.

Hypericum floribus semitrigynis, staminibus corolla breuioribus, caule fruticoso semperuirente. *Gruan. virg. 112.*

Habitat in America *septentrionali.* ♄.

Caules *recti, purpurascentes.* Folia *saepius reuoluta, vnde angusta Rosmarini.* Foliola *ramulorum primordia, ex alis plurima.* Panicula *parua, terminalis.* Flores *primae secundaeque dichotomiae sessiles; reliqui terminales, pedunculati, numero rarius vltra 7.* Stamina *petalis non longiora.*

That the quotation from Gronovius (misprinted "*Gruan.*"), Fl. Virg. ed. 2: 112 (1762) and the further notes given by Gronovius referred to the plant familiarly known as *H. prolificum* (our FIG. 4) has already been noted by Gray and others. The difficulty is, that the plant described in detail (our FIGS. 1–3) "Folia *saepius reuoluta, vnde angusta Rosmarini.* Foliola *ramulorum primordia, ex alis plurima* . . . Stamina *petalis non longiora*", is the one which Linnaeus had in his herbarium as "*proliferum*" with an additional memorandum of some of the characters given in his description. His published specific name *prolificum* was, obviously, from the axillary fascicles ("Foliola . . . *ex alis plurima*").

The relationship of sheet no. 20 seems, from examination of the inflorescence and the comparative length of stamens and petals to be, as Svenson indicated, possibly with what we have considered true *H. prolificum* rather than with *H. densiflorum*. The extreme variation in leaf-characters, however, seems to us to indicate a differentiation more basic than the mere aberrancy from *H. prolificum* which Svenson considers it. In the vast amount of herbarium-material available we have not been able to find anything which can be identified unquestionably with the Linnaean sheet number 20. The only name which we have found in the literature which is possibly applicable to *H. prolificum* sensu Gray, Man. (and current authors) is H. SPATHULATUM (Spach) Steud. Nomencl. ed. 2, i. 789 (1840), based on *Myriandra spathulata* Spach, Hist. Nat. Vég. v. 440 (1836)[1]. Spach's description was detailed and he cited as its basis material at Paris received from Leconte as *H. prolificum*. Asa Gray, looking up the Spach type, made the unpublished memorandum that it was *H. prolificum* (in his sense). This name of course invalidates *H. spathulatum* Keller in Engler, Bot. Jahrb. lviii. 195 (1923), based on one of Harper's numbers from Georgia which we have not seen.

FRAXINUS AMERICANA L. Sp. Pl. ii. 1057 (1753), as pointed out by the senior author in Journ. Arn. Arb. xxvii. 390, 391 (1946), was based by Linnaeus primarily on the Gronovian account and Catesby's plate. The Catesby plant is clearly of the southern Water Ash, *Fraxinus caroliniana* Mill. (1768) and the quotation from Gronovius was altered by the addition of "petiolis teretibus", a phrase which Gronovius did not use. Since the latter character is a distinctive one of the Water Ash and not of the White Ash, universally known as *F. americana*, it was naturally inferred that the Clayton specimen cited by Gronovius was of the same species as Catesby's. It was, however, pointed out that Linnaeus had in his own herbarium as *F. americana* a

[1] Unfortunately *Index Kewensis* cites *Myriandra spathulata* and other species fully described by Spach in his extended treatment of the *Hypericaceae* in his Histoire Naturelle des Végétaux, vol. 5 (June, 1836) as published only in Annales des Sciences Naturelles, Sér. 2, v. (June, 1836), a mere summary of the more extended monograph then being printed. In the briefer summary most of the species appear only as names, with reference to Spach's forthcoming "*Suites à Buffon*", the latter name used for Spach's series of monographs published in his Histoire Naturelle des Végétaux (see Pritzel, Thesaurus, entry 8805). The publication of most of the species should date from the latter work.

HYPERICUM PROLIFICUM L.: FIGS. 1–3, TYPE; FIG. 1, plant, × ½; FIG. 2, portion of description (quoted by Svenson), × ½; FIG. 3, summit of plant, × ⅘.

H. SPATHULATUM (Spach) Steud. = *H. prolificum*, in part, of L. and sensu most authors: FIG. 4, a specimen, × ½, in the Linnaean Herbarium.

mature leaf of characteristic White Ash. The argument was used that only by accepting this specimen as the type could the name *F. americana* be retained in its long-established sense. It now proves, happily, that the Clayton sheet, described by Gronovius, consists of a very young branchlet of undeveloped leaves and a mature leaf of perfectly typical *F. americana*, the leaflets rounded at base and definitely whitened beneath. This mature leaf is so like the leaf in the Linnaean Herbarium that it is difficult to believe that the two were from different branchlets. The ground for maintaining *F. americana* in its traditional sense is thus vastly strengthened.

Chelone glabra L. Sp. Pl. ii. 611 (1753). The uppermost leaves on the type-specimen are not measurably reduced in size as implied in Pennell's key (Scrophulariaceae of E. Temp. N. Am. 187 (1935)). Although there is some variation in leaf-size in the large number of specimens in the Gray Herbarium some modification in the key, which allows for no variation, is necessary.

Cassine Peragua L.—In 1900 Loesener[1] discussed in some detail the status of the name *Cassine* L. and reviewed Linnaeus's disposition of *C. Peragua* through several of his works. He concluded that *C. Peragua* is a *nomen nudum*. Obviously, he has confused his terms, because the name was perfectly validly published. It is, however, an outstanding example of a *nomen ambiguum* as well as of a *nomen confusum!*

In the Linnaean Herbarium there are two specimens of American shrubs under the name *Cassine Peragua*. One of them (numbered 380.2) bears the name "Peragua" in Linnaeus's hand as well as an inscription by Sir James Edward Smith: "Viburnum cassinoides HB. diversum a V. cassia. HL. Viburnum laevigatum. Ait. Willd. Sp. Pl. v. 1. 1492". This plant is a vigorous sprout with narrowly elliptic and acuminate leaves, those of the leading shoot abundantly crenate-dentate. It is easily matched by narrow-leaved specimens of *Viburnum cassinoides* L.

The second specimen (numbered 380.3 and pinned to 380.2), also marked "Peragua" by Linnaeus, is a characterisftic sterile shoot with obovate, remotely dentate leaves of *Viburnum obovatum* Walt. Fl. Carol. 116 (1788). This identification has

[1] Loesener in Engl. Bot. Jahrb. xxviii[2]. 154, 155 [footnote] (1900); and in Monog. Aquifol. in Nov. Act. Abh. der Kaiserl. Leop.-Carol. Deutschen. Akad. Naturf. lxxviii. 496 (1901).

been many times noted in the literature and there seems no good reason to doubt it; particularly since the Linnaean specimen can be well matched by a small specimen of leaves and flowers in Walter's Herbarium which agrees well with his description of *V. obovatum*, although labeled simply "Viburnum".

As Loesener showed, Linnaeus's own concept of *Cassine Peragua* was not clear. First mention of the plant by Linnaeus was in his Materia Medica, 50 [genus no. 153] (1749) where, under *Cassine* of Hort. Cliff. 72 he took up

> CASSINE vera perquam similis arbuscula, phillyreae foliis antagonistis. *Pluk. mant.* 40. *t.* 371. *f.* 3?
> LOC: Aethiopia, Carolina. *Arbor mansveta*
> PHARM: PERAGUAE Folia.
> . . . . . .

In Species Plantarum, ed. 1, Linnaeus cited his Hort. Cliff. and Materia Medica references among many others, all of which referred to an Old World plant, giving again however, the "Habitat in *Aethiopia, Carolina.* ♄".

In ed. 2 of Species Plantarum one reference of ed. 1 was removed, another reference was added and the habitat altered to read "*Habitat in* Aethiopia. ♄.". Also, in ed. 2 a new *Viburnum*, *V. cassinoides* was described with one of the citations being "*Mill. dict. t.* 83. *f.* 1.". In the Mantissa Altera the reference newly added to *Cassine Peragua* in Sp. Pl. ed. 2 was transferred to *C. capensis;* the Miller reference given under *Viburnum cassinoides* of ed. 2 was placed here under *C. Peragua* and the habitat revised to read "*Habitat in* Carolina, Virginia. ♄.". Also, an additional diagnosis was appended:

> Folia *petiolata, lato-lanceolata, acutiuscula, serrata absque venis elevatis.*
> Petioli *dorso decurrentes*, unde *Ramuli ancipites.*
> Corymbi *breves.*
> *Obs. caute distinguenda a* C. capensi.

The new diagnosis as well as the reference to the Miller plate seem to be based on the narrow-leaved form of *V. cassinoides* to which we are referring specimen 380.2 of Linnaeus. Although specimen 380.3 is *Viburnum obovatum*, it is clear that Linnaeus did not describe that species as his *C. Peragua*, but rather *V. cassinoides* which he had already defined under *Viburnum*.

Since the taxonomic elements of Linnaeus's *Cassine Peragua* can be disposed of by placing them in species of *Viburnum* under relatively well understood names, it would seem soundest policy to reject the name *Cassine Peragua* permanently rather than to apply it in still another sense and further increase the confusion.

RUDBECKIA LACINIATA L. Sp. Pl. ii. 906 (1753) occurs as four fairly well defined geographic varieties. True *R. laciniata* (photograph of the TYPE before us) is very coarse, up to 3 m. high, with soon reflexed ligules 2–6 cm. long; the greenish-yellow disk at first hemispherical but soon columnar and elongated to 1.5–3 cm. and becoming 1.3–2.5 cm. broad; achenes 5–6 mm. long. Its lower leaves are petioled and pinnate, with 5–7 incised or 3-lobed leaflets, the median and upper similar but sessile, the uppermost often simple. This coarse species extends from Quebec to Montana, south to Nova Scotia, New England, northern Florida, Louisiana, Texas, New Mexico and Arizona, including *R. ampla* Nels. in Bull. Torr. Bot. Cl. xxviii. 234 (1901).

In the southeastern United States most *Rudbeckia laciniata* is lower, 0.7–1.5 m. high, and more slender, with disks only 0.7–1.3 cm. thick and elongating only to 0.7–1.5 cm.; the ligules 1.5–3.5 cm. long; and achenes 3.5–5 mm. long. This southeastern series consists of three well defined varieties. The commonest, var. DIGITATA (Mill.) Fiori in Fiori & Paoletti, Fl. Anal. Ital. iii. 300 (1904), based on *R. digitata* [as *digitatis*] Mill. Gard. Dict. ed. 8, no. 6 (1768), is smooth or with the thin leaves merely scabrous, the basal and lower cauline leaves with their pinnae cut into narrowly lanceolate to almost linear segments. This variety occurs from eastern Maryland to Georgia. A photograph of the TYPE of *R. digitata* Mill., secured by the junior author, is thoroughly characteristic of the variety as here interpreted.

Var. HUMILIS Gray, Syn. Fl. N. Am. i^2. 262 (1884), is quite as slender and low as var. *digitata*, with some, usually all, the thin lower leaves ovate and uncleft or but slightly cleft into 1 or 2 pairs of broad undivided segments or leaflets, its upper leaves mostly simple and ovate or ovate-elliptic and petioled. Described as growing on "Alleghany Mountains from Virginia to Georgia and Tennessee, common in open woods, &c., at 4,000 to 6,000 feet", it has an isolated station on the Peninsula of Virginia:

floodplain of wooded swamp, near Mill Creek, 3½ miles southwest of Williamsburg, *Grimes*, no. 4600, in an area where many other montane plants are isolated; and it is also found in the mountains of Kentucky: near Poor Fork Post Office, Harlan Co., *Kearney*, no. 324.

The fourth variety is the cinereous plant of Florida, with leaves densely soft-pilose beneath, described as *R. heterophylla* Torr. & Gray, Fl. N. Am. ii. 312 (1842). In everything but its dense and short pubescence and firmer leaves it closely resembles var. *humilis*. Neither Gray, Syn. Fl., nor Small gave any characters, except the pubescence, to separate it and we can find none. The TYPE-series has simple cordate-ovate basal leaves with coarse dentation, in outline quite as in most typical var. *humilis*. Var. *heterophylla* seems to be confined to Florida, south of the slightly more northern and chiefly montane var. *humilis*. We are calling it

R. LACINIATA L., var. **heterophylla** (Torr. & Gray), stat. nov. *R. heterophylla* Torr. & Gray, Fl. N. Am. ii. 312 (1842).

THE TYPE OF RUDBECKIA HIRTA (PLATE 1102).—*Rudbeckia hirta* L. Sp. Pl. ii. 907 (1753), his species no. 3, rested in part on references to earlier authors, in part upon material actually before Linnaeus while preparing *Species Plantarum*. The treatment was as follows:

3. RUDBECKIA foliis indivisis spatulato-ovatis, radii petalis emarginatis.
Rudbeckia, ramis indivisis unifloris, foliis ovato-lanceolatis, hirta. *Büttn. cunon.* 227.*
Rudbeckia foliis lanceolato-ovatis alternis indivisis, petalis radii integris. *Gron. virg.* 181.
Obeliscotheca integrifolia, radio aureo, umboae atrorubente. *Dill. elth.* 295. *t.* 218. *f.* 285.
Chrysanthemum helenii folio, umbone floris gradiusculo prominente. *Pluk. alm.* 99. *t.* 242. *f.* 2. *Moris. hist.* 3. *p.* 23. *Raj. suppl.* 210.
Habitat in Virginia, Canada. ♂. ♃

Two of the older references were to illustrations, but certainly Plukenet's figure is not of the same plant as that well illustrated and described by Dillenius, whose plate and description have been generally accepted as the standard, at least, of true *R. hirta*. Thus, in the Synoptical Flora, i². 260 (1884), Gray's first citation for *R. hirta* read: "Spec. ii. 907 (Dill. Elth. t. 218)".

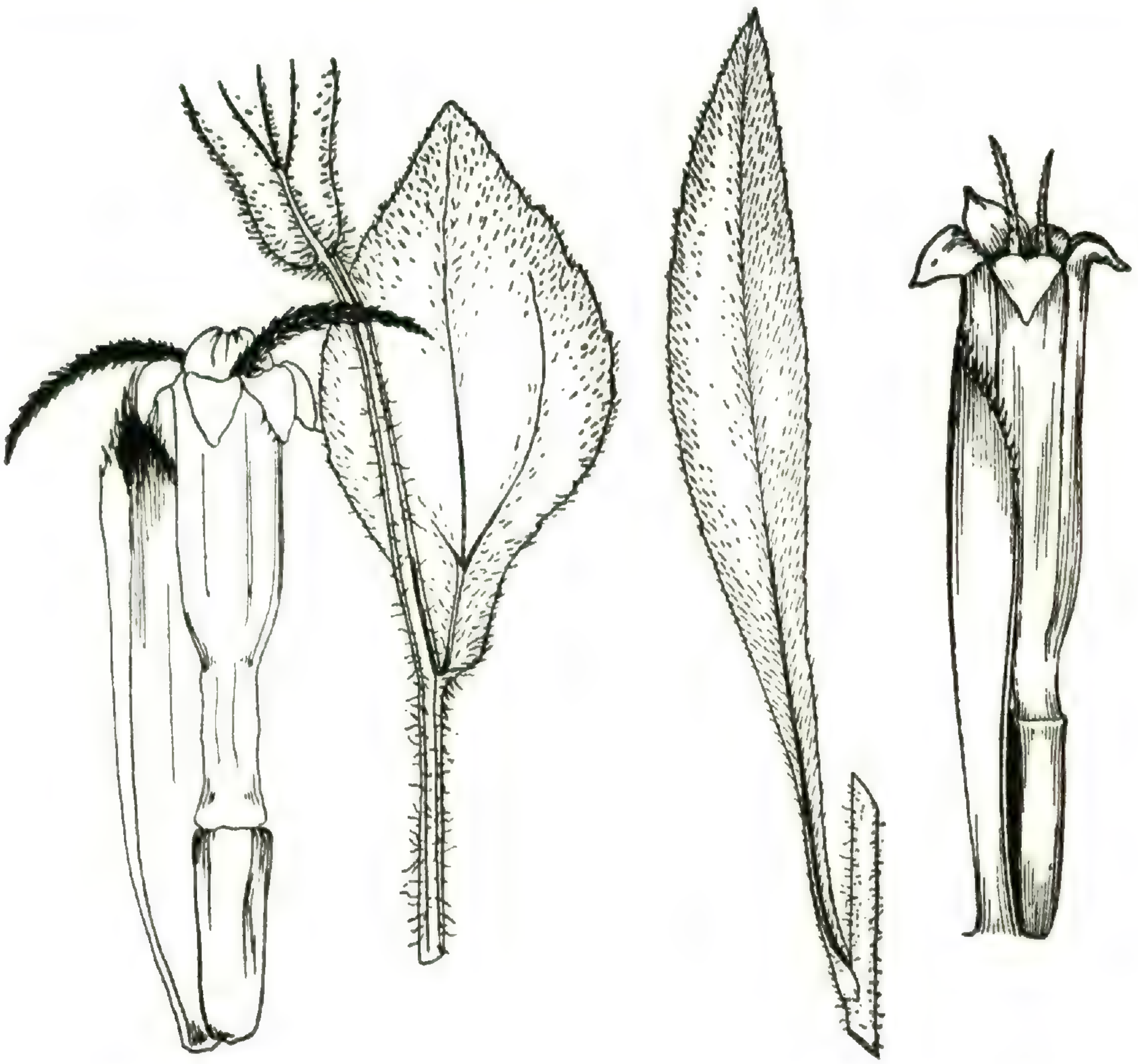
RUDBECKIA HIRTA L.: FIGS. 1 and 2, TYPE, × ca. ½.
R. SEROTINA Nutt.: FIG. 3, TYPE or ISOTYPE, × ⅓; FIG. 4, upper, and FIG. 5, lower surface of leaf, × 10.

Again, T. V. Moore in Pittonia, iv. 174 (1900) wrote: "The typical *R. hirta* can be identified easily, by reference to the figure and full description given by Dillenius, on which figure and description Linnaeus founded the species". The latter statement is, of course, somewhat overdrawn, since Linnaeus cited other descriptions and one other illustration and gave his own brief descriptive phrase. Furthermore, Linnaeus at that time had his own specimen (our FIGS. 1 and 2) which he clearly marked "Hort ups. [Hortus Upsaliensis] 3 *hirta*". This, of course, is the real TYPE of the species, although clearly conspecific with the Dillenian plant, both plants cultivated in Europe and derived from Virginia. This plant is native in open woods and thickets from western Massachusetts to Illinois, south to Georgia and Alabama and was described as *R. monticola* Small in Torreya, i. 67 (1901) or as *R. hirta*, var. *monticola* (Small) Fernald in RHODORA, XXXIX. 457 (1937). The Linnaean type is clearly matched by many specimens, such as *Fernald & Long*, no. 8895 from rich woods south of Williamsburg, Virginia.

At first glance Linnaeus's type of *Rudbeckia hirta* suggests that he had a pied or parti-colored form such as is so frequent but rarely twice alike in the narrow-leaved plant which commonly though erroneously passes as *R. hirta* but which, originating in the Great Plains area of North America, has spread (long after the days of Linnaeus) as a field-weed generally eastward to Newfoundland and the Atlantic states. Close examination, however, shows that the dark areas, some of them not at the bases of ligules, are really crushed disk-florets which, owing to too much pressure on the disk, have assumed the false appearance of dark bases of golden ligules!

The common field-weed which has crossed the continent from the Great Plains, the plant with narrowly oblanceolate basal leaves and oblanceolate to lance-linear cauline leaves, which was erroneously treated and illustrated by the senior author as true *Rudbeckia hirta* in RHODORA, l. c. pl. 487, fig. 4 (1937), the weedy plant with somewhat bulbous-based trichomes, seems first to have been described as *R. serotina* by Nuttall in Journ. Acad. Nat. Sci. Phila. vii. 80 (1834), our PLATE 1102, FIGS. 3–5. Gray, in the Synoptical Flora, identified Nuttall's western plant, "at least the cult. plant described, fide herb. Acad. Philad."

with the wide-ranging plant he then called *R. hirta*, with the blanket-range, "Saskatchewan and W. Canada to Florida, Texas and Colorado: naturalized in grass-fields in Eastern States". This originally western narrow-leaved plant is also *R. flava* T. V. Moore, l. c. 179 (1900), an isotype from Wyoming well displaying



RUDBECKIA HIRTA (left) and R. SEROTINA (right): median cauline leaf, × 1; flower and pale, × ca. 10.

the characteristic bulbous-based trichomes. This now essentially transcontinental weed is, then, R. SEROTINA Nuttall.

Originating on the Great Plains or the foothills of the eastern Rocky Mountains, the plant obviously has had a wholly different history from the indigenous and broader-leaved plant of the eastern woodlands and thickets. Although the western species has now become thoroughly naturalized and is an aggressive

weed of fields, clearings and even borders of woodland near town, eastward to Newfoundland and the Atlantic coast of the United States, it differs from true *Rudbeckia hirta* in its consistently narrower leaves which are entire or only slightly crenate, whereas the lower and median leaves of *R. hirta* are broader and coarsely toothed (usually serrate); and the pales, disk-corollas and styles show striking differences, as brought out in the text-figures, p. 174, prepared for us by Mrs. Chester Cross (Shirley Gale). *R. serotina* seems better treated as a species than as a series of varieties of true *R. hirta*. Incidentally, genuine *R. hirta* has the conservatism of the old Appalachian forest-flora, while *R. serotina*, originating in a much more youthful campestrian region and with a strongly aggressive and pioneering habit, has shown a very great tendency to sport, especially in the form, size and color of its ligules, since it moved into the disturbed and cultivated areas to the east of its original home. In other words, in its newly adopted eastern area it is in a wholly unstable and aggressive stage of evolution, while true *R. hirta* is quite stabilized. The nomenclature of *R. serotina* and its principal variations is as follows:

Rudbeckia serotina Nutt. in Journ. Acad. Nat. Sci. Phila. vii. 80 (1834). *R. flava* T. V. Moore in Pittonia, iv. 179 (1900). *R. hirta* sensu Am. auth. in large part and especially Fernald in Rhodora, xxxix. 458 (1937).

Var. **lanceolata** (Bisch.) stat. nov. *R. lanceolata* Bisch., Del. Sem. Hort. Heidelb. 4 (1848); ex Walp. Ann. ii. 855 (1852).

Var. **sericea** (T. V. Moore), comb. nov. *R. sericea* T. V. Moore, l. c. 178 (1900). *R. hirta* L., var. *sericea* (T. V. Moore) Fern., l. c. 457, t. 487, fig. 3 (1937).

Var. **corymbifera** (Fern.), comb. nov. *R. hirta* L., var. *corymbifera* Fern. l. c. t. 487, figs. 1 and 2 (1937).

Among the innumerable sports of *Rudbeckia serotina* are the following:

Forma **tubuliformis** (Burnham), stat. nov. *R. hirta*, var. *tubuliformis* [as *tubuliforme*] Burnham in Am. Botanist, xx. 22 (1914).

Forma **rubra** (Clute), stat. nov. *R. hirta*, var. *rubra* Clute in Am. Botanist, xix. 134 (1913).

Forma **pulcherrima** (Farwell), stat. nov. *R. hirta*, var. *pulcherrima* Farwell in Mich. Acad. Sci. Rep. vi. 209 (1904).

Forma **annulata** (Clute), stat. nov. *R. hirta*, var. *annulata* Clute, l. c. (1913).

Forma **viridiflora** (Burnham), comb. nov. *R. hirta*, f. *viridiflora* Burnham, op. cit. xxii. 151 (1916).

Forma **homochroma** (Steyerm.), comb. nov. *R. hirta*, f. *homochroma* Steyerm. in Rhodora xl. 179 (1938).

Forma **pleniflora** (Moldenke), comb. nov. *R. hirta*, f. *pleniflora* Moldenke in Phytologia, ii. 320 (1947).

Many other forms doubtless occur. In this connection the statement from Clute is illuminating: "The original plant, with a blotch of red at the base of each ray-flower, is known as *Rudbeckia hirta pulcherrima.* Another form . . . is *R. h. rubra.* Still others . . . *R. h. annulata* . . . *R. h. tubuliforme* . . . and *R. h. flavescens* . . . The longer one works with *Rudbeckia hirta*, the clearer it becomes that the botanical species consists of a large number of elementary forms."—Clute in Am. Botanist, xxx. 159 (1924).

Chondrilla nudicaulis L. Mant. Alt. 278 (1771). This species is cited by Linnaeus as having its "*Habitat in* America *septentrionali; ad pyramides* aegypti". The plant is, as earlier recognized, *Lannaca nudicaulis* (L.) Hook. f. of Mediterranean regions and not known in America.

(To be continued)

SIX ADDITIONS TO THE ADVENTITIOUS FLORA OF QUEBEC

Marcel Raymond and James Kucyniak

The purpose of the present communication is to furnish fuller detail on five introduced species which the authors are responsible for inclusion in Prof. Ernest Rouleau's recently published "Supplément à la Flore laurentienne" (64 pp., Institut Botanique, Université de Montréal. 1947). They are *Bromus tectorum* L., *Cynosurus cristatus* L., *Alliaria officinalis* Andrz., *Epilobium hirsutum* L. and *Thladiantha dubia* Bunge. Mention of the occurrence of a sixth, *Centaurea montana* L., is made here for the first time.

In June 1945, the senior author observed a number of patches of Bromus tectorum L., a European grass of common occur-

rence in New England, growing alongside the Canadian Pacific Railroad line running through St. Jean (St. Jean Co.). Some time later, Frère ROLLAND-GERMAIN located another stand at Laval des Rapides (Laval Co.), near Montreal. The authors now report a third station found, in August 1945, at St. Joseph de la Rive, in distant Charlevoix County, where the brome-grass throve as a railroad-side weed. With as many stations to its credit to date, *Bromus tectorum* L. may well be included with the flora adventitious to Quebec.

CYNOSURUS CRISTATUS L., belonging to the same family, provides still another addition. To the authors' knowledge no record exists at present reporting the appearance of the dog's-tail grass in Quebec. However, in the Marie-Victorin Herbarium, there is, and has been for a number of years now, a specimen collected by MARIE-VICTORIN & al. at Baie de Gaspé (Gaspé Co.), in 1923. Last summer, interest in its occurrence in the province was revived when it was discovered, during the recent foray of the Botanical Society of America in August, growing in marked abundance in a wet pasture at Duchesnay (Portneuf Co.). The odd-looking grass with its dense, stiff, spikelike panicles proved somewhat of a puzzle to a number of those seeing it for the first time before Dr. Jason SWALLEN recognized it on sight. Naturalized from the Old World a number of years ago, its present range of distribution in North America extends from Newfoundland, Quebec and Nova Scotia to Michigan, southward to Virginia, and westward to Oregon and Washington.

ALLIARIA OFFICINALIS Andrz., the third introduction, on the other hand, belongs to an altogether different family. In an old record (Ott. Nat. **12:** 163. 1898), James M. MACOUN states that the crucifer, "Not before recorded from the province of Quebec", was found at the Cove, Quebec city, by Mrs. BRODIE. The senior author first came across the species growing in Iberville (Iberville Co.) and imparted the information to Bernard BOIVIN who incorporated it in a report published some time ago (Contrib. Inst. Bot. Univ. de Montréal **44:** 37–38. 1942). The plants have increased in number since the colony was first noted and have now invaded an adjoining waste field and a neglected garden. A new station was descried early last summer by Dr.

Risto TUOMIKOSKI, of Finland, and the junior author of the present note. Plants of the officinal species of *Alliaria* bordered the sidewalk in the east end of Notre Dame street, within close proximity of the Montreal Harbor grain-elevators.

Though some authors, notably W. C. Muenscher ("Weeds", p. 344, 1936), have gone as far as to include Quebec in the American range of EPILOBIUM HIRSUTUM L., no specimen of the European willow-herb collected in the province was known to exist in the more important Canadian herbaria prior to 1940. In carrying out botanical investigations along the upper St. Lawrence river, to estimate to what extent the construction of a new dam would affect existing beach-lines, MARIE-VICTORIN & al., first came across the tall, hirsute species of *Epilobium*, new to their experience in the field.

Other large clumps were observed, in 1944, growing at a new station, Rivière Beaudette (Soulanges Co.), which lies on the opposite shore in the same upper St. Lawrence river district. A year later, the authors found a number of plants about a mile or so within the western limits of the city of Montreal. The station is near the Turcot stop on the Montreal Tramways Company line "Lachine No. 91", in the lowlands bordering the stream marking the bed and last vestige of the St. Pierre river of local historical prominence.

It seems probable that the plant, first introduced in the region of Lake Ontario, has come into Quebec along the route of migration followed by several native plants, such as *Allium canadense* and *Justicia americana* to name but two, via the shores of the St. Lawrence river.

Legal surveys of the type mentioned above, have recently given local botanists the opportunity to scrutinize more carefully a region which has always been looked upon as warranting little interest and, consequently, left quite neglected. Some justification for the former lack of enthusiasm may be found in noting that the intensive work carried out so far in the territory has yielded but little: an extra-estuarine locality for SCIRPUS SMITHII Gray, the western ASTER ANGUSTUS (Lindl.) T. & G. with a rather "indigenous" look to it, and the first record in America for ALISMA GRAMINEUM Gmelin ssp. WAHLENBERGII Holmberg ap.

Samuelsson (Svensk Bot. Tidskr. **16:** 41. 1922)[1], which according to SAMUELSSON[2], is known only from "Suecia media et in Fennia". Like *Butomus umbellatus* L., typical *Alisma gramineum* Gmelin is a pesky weed around Montreal. It, too, is now progressively invading the Richelieu river valley.

Another native of Europe, CENTAUREA MONTANA L., comes within the scope of this note. In July 1947, it was found growing in Vaudreuil (Vaudreuil Co.), in a well preserved maplewood far removed from any garden-site. Giving the discovery closer attention, the authors, searching through herbarium material, have turned up an earlier and hitherto unreported collection from the island of Orleans made by F. MICHEL, in 1933. The above stations permit listing this composite with entire, decurrent leaves as an additional item to Quebec's subspontaneous flora. The mountain bluet, as it is popularly called, is frequently cultivated in one or more of its numerous color-forms in flower gardens.

The final addition to report upon in this note is an Asiatic member of the *Cucurbitaceae:* THLADIANTHA DUBIA Bunge. Producing tubers, bearing heart-shaped leaves uniformly clothed with a rather stiff pubescence, and yellow campanulate unisexual flowers, for features more or less as salient as those listed above, the plant has suscitated marked interest among taxonomists since BUNGE first discovered it in waste places in the vicinity of Peking (Enum. Plant. Chin. Bor. 29. 1833). Its culture in the Jardin des Plantes de Paris dates to almost a century ago. With living plants at hand, CH. NAUDIN (Annales des Sciences Naturelles, Série IV. **12:** 150. 1859) redescribed and ably illustrated the species, while W. H. HOOKER later contributed a fine colored plate which accompanies his lengthy description in *Curtis's Botanical Magazine* (XC. Tab. 5469. 1864).

The climber is not often grown by amateur gardeners according to L. H. BAILEY (*Hortus Second.* 728. 1941), but, when planted, has shown a marked tendency to escape from cultivation.

[1] *Alisma gramineum* Gmelin var. **Wahlenbergii** (Holmberg) Raymond & Kucyniak, stat. nov.—*Alisma gramineum* Gmel. ssp. *Wahlenbergii* Holmberg ap. Samuelsson, Svensk Bot. Tidskr. **16:** 41. 1922; Skandinaviens Flora H. I: 110. 1922; Bot. Notis. 1922, p. 207; Ark. för Bot. Band **24**A. (N: O 7): 45–46. Taf. 6. 1932; *A. Plantago* β. *graminifolia* Wahlenberg, Flora Upsaliensis. 122. 1820 et auct. suec. (non cet.).

[2] SAMUELSSON, G., *Die Arten der Gattung Alisma L.* Arkiv. för Botanik. Band **24**A. (N: O 7): 1–46. Mit 6 Tafeln. 1932.

A member of the Garden staff, Mr. Wilfrid Meloche, found the cucurbit in a vacant lot in Lachine, and brought it to the authors' attention who, in turn, established its identity. Three tubers were unearthed and transplanted to the Montreal Botanical Garden. In an inauspicious locality bordering a nursery-fence, the plants have fared well in spite of regular hoeing between rows and mechanical weeding by means of the "rototiller".

To find *Thladiantha dubia* thriving as a garden escape in a locality with winters as rigorous as ours tends to show that the species is hardier than most authors have so far assumed it to be.

Montreal Botanical Garden

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STELLARIA UNIFLORA Walt.; FIG. 1, TYPE, × ½; FIG. 2, portion of TYPE, × 2; FIG. 3, ARENARIA BREVIFOLIA Nutt., plant, × 1, from Pine Mountain, Georgia, *Perry & Myers* in Pl. Exsicc. Gray., no. 546, not *A. uniflora* Luce (1823).

Rhodora

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Vol. 50. **August, 1948.** **No. 596**

STUDIES OF AMERICAN TYPES IN BRITISH HERBARIA

M. L. Fernald and Bernice G. Schubert

(*Continued from page 176*)

Part III. A Few of Philip Miller's Species

Pinus palustris Mill. Gard. Dict. ed. 8, no. 14 (1768).—Miller's description of *Pinus palustris* was very brief and rather inconclusive:

> 14. Pinus (*Palustris*) foliis ternis longissimis. *Pine-tree with the longest leaves growing by threes out of each sheath.* Pinus Americana palustris trifolia, foliis longissimis. Du Hamel. *Three-leaved, Marsh, American Pine with the longest leaves.*

Then, after discussing at length the propagation of pines, Miller continued:

> The fourteenth sort grows naturally on swamps in many parts of North America, where I have been informed they grow to the height of twenty-five or thirty feet. Their leaves are a foot or more in length, growing in tufts at the end of the branches, so have a singular appearance, but I have not heard the wood was of any use but for fuel; and there are few places here where these plants do well, for in very severe frosts their leading shoots are often killed, and in dry ground they will not thrive; so that unless the soil is adapted for them, it is to little purpose planting them.

Miller's *Pinus palustris* followed five other North American species, three of them with 3-leaved fascicles: *P. rigida* (leaves "3′–5′ long", *Sargent*, Man.); *P. Taeda* (leaves "6′–9′ long", *Sargent*) and *P. echinata* (leaves "3′–5′ long", *Sargent*) and

"longissimis" was evidently in comparison with these, unless borrowed from Du Hamel, although Miller's supplementary account of "leaves . . . a foot or more in length" was perhaps hearsay but must be taken into account.

Du Hamel, quoted by Miller, had simply

> 18. PINUS *Americana palustris trifolia, foliis longissimis.*
> Pin de marais à trois feuilles très-longues.[1]

Du Hamel had life-size plates of six species (not including his no. 18), these with leaves from 1–5 inches long. His "*longissimis*", then, meant more than 5 inches.

Although it is somewhat customary to treat as *Pinus palustris* Mill. the Long-leaf or Georgia Pine, Michaux filius, who surely knew our commoner trees, refused to take it up and named Long-leaf Pine *P. australis* Michx. f. Hist. Arb. Am. i. 64, pl. 6 (1810). It certainly is most doubtful if Miller (or Du Hamel before him) had *Pinus australis* growing in England or France. This tree is an inhabitant of sandy barrens or dry to dryish pine-barren or, extending locally back to the outer Piedmont, of dry crests or slopes of granitic or other siliceous rock: "C'est à peu de distance de Norfolk, dans la basse Virginie, où commencent les landes americanes, *Pine Barrens*, que le *Pinus australis* commence aussi à se montrer" (Michx. f., l. c. 65).

> "The name originally imposed on this species is unfortunate, as it produces a false impression, and has been the source of error to foreigners, if not to our own countrymen. If an inhabitant of the Southern States, ignorant of Botany, should be interrogated respecting the P. Palustris or Swamp Pine, he would instantly revert to the P. Taeda, and his answers would be drawn from that species.
>
> "Grows in dry sandy soils, where the sub-soil however, though 2 or 3 feet below the surface is usually of clay, covering nearly all of the ridges along the coast of Carolina and Georgia within 120 miles of the ocean. Wherever the land becomes moist or fertile, the P. Taeda, and sometimes the P. Rigida encroach upon it."—Elliott, Sk. ii. 637, 638 (1824).

"Occupying all the highest and driest sandy lands" of eastern North Carolina (Pinchot & Ashe, Timber Trees and Forests of North Carolina, 131 (1897)); etc., etc.

Everyone who knows the Long-leaf Pine in its native soil will agree with F. A. Michaux and Elliott that the specific epithet *palustris* as applied to it is wholly misleading. They will also

[1] Du Hamel, Traité des Arbres, ii. 126 (1755).

STELLARIA PALUDICOLA Fernald & Schubert: FIG. 1, TYPE, × $^1_2$, from Myrtle Beach, Horry Co., South Carolina, *Weatherby & Griscom*, no. 16,523; FIG. 2, flower, × 1, from North Carolina, *M. A. Curtis*. Mistakenly supposed to be *S. uniflora* Walt.

agree that there are 3-leaved pines in the South which delight in savannas, marshes or wet shores: such characteristic trees as Loblolly or Swamp Pine, *P. Taeda* L., its tendency (although often enough in old fields and dry soils) to grow in swamps noted (above) by Elliott and emphasized by Pinchot & Ashe (p. 125) when they wrote: "The original growth is on moist deep soil, but the second growth has sprung up largely in old fields", etc., whence the common name Old-field Pine. In other words, *P. Taeda*, one of the most aggressive and weedy pines of the South, will grow in either dry or wet habitats and many labels before us bear such data as the following: "peaty pineland", "light, moist soil"; "light, mostly damp soil"; "old fields (also in swamps)"; "moist or wet woods". Another 3-leaved pine of wet or marshy habitats is Pond Pine, Savanna Pine or Swamp Pine, *P. serotina* Michx., Fl. Bor.-Am. ii. 205 (1803), described by the elder Michaux as growing "in humidis . . . cupressetis"; habitats restated in Elliott's "Grows around ponds and in damp soils"; and well stated by Pinchot & Ashe's "It occurs on low peaty or wet sandy soils of the worst quality". A third southern pine which often has three leaves and to which Small applies the name *P. palustris*, is the very southern Slash or Swamp Pine, which was first recognized by Elliott as *P. Taeda*, var. *heterophylla* Ell., Sk. ii. 636, growing "Along the marshes near the mouths of the fresh-water rivers (at least in Georgia)". This was renamed *P. Elliottii* Engelm. in Sargent, Cat. Forest Trees, 74 (1880) and in Trans. Acad. Sci. St. Louis, iv. 186, t. 1–3 (1880). In his Report on Forests N. Am. 202 (1884) Sargent reduced this species to *P. cubensis* Griseb., a West Indian species which, passing up the Florida Keys to peninsular Florida, reaches its northern limit in marshes of southeastern South Carolina. To be sure, Small maintains the West Indian tree which reaches the Keys as distinct from *P. Elliottii*, to which he applies the name *P. palustris*. The separation of the two seems rather doubtful but, even so, *P. Elliottii* (Small's *P. palustris*) is assigned by Small to "Shallow ponds, swamps and low grounds . . . thriving under the influence of either salt or fresh water." Sargent's statement in the Silva, xi. 158, is very different: calling it *P. heterophylla* (Ell.) Sudworth, Sargent said: "mingled with the Long-leaved and Loblolly Pines in the open forests . . . As a timber-tree the

Slash Pine, which produces straight sound spars of large dimensions, is little inferior to the Long-leaved Pine, the wood of the two trees being usually manufactured and sold indiscriminately. It is heavy, exceedingly hard, very strong, tough, durable.....” That is not a very good match for Miller's “I have not heard the wood was of any use but for fuel; . . . and in dry ground they will not thrive”. Here, then, are species for which the name *P. palustris* or “Marsh Pine” of Miller or “Pin de marais” of Du Hamel would be perfectly appropriate; for surely these names, as F. A. Michaux and Elliott clearly stated, are not appropriate for Long-leaf Pine.

As emphasized, Miller, who, as shown by his second paragraph, was quoting vaguely what “I have been informed” by those who had seen trees “growing naturally on swamps in many parts of North America”, had “not heard the wood was of any use but for fuel”. Surely such a characterization of the wood is not applicable to that of Long-leaf Pine, “The most valuable of the Pitch Pines and one of the most important timber-trees of North America, . . . produces heavy, exceedingly hard very strong tough coarse-grained durable wood” (Sargent, Silva, xi. 153 (1897)); nor is it applicable to *P. Elliottii, heterophylla* or *cubensis*, as noted above. But *P. Taeda*, “introduced into Europe before 1713” (*Sargent*, l. c. 114), has long been called Loblolly Pine, from *loblolly*, a loutish, foolish or useless person, and, although, when grown on dry upland now an important wood in eastern Virginia, it has the timber thus described by Sargent (l. c. 113): “A large part of the trees of original growth and the oldest and best matured second-growth trees now produce coarse-grained wood, nearly one half the diameter of the trunk being sapwood, while the wood of trees which have grown rapidly on abandoned fields and now supply an important part of the timber cut on the south Atlantic coast, whence it is shipped in large quantities to the north, is very coarse-grained and still more largely composed of sapwood.” F. A. Michaux wrote (p. 99):

> “J'ai toujours vu avec surprise que des arbres de 7 décimètres (30 pouces) de diamètre, à 1 mètre (3 pieds) de terre, avoient 5 à 6 décimètres (20 à 24 pouces) d'aubier, et je n'ai jamais trouvé dans des individus d'environ 3 décimètres (un pied) de grosseur, et de 10 à 11 mètres (30 à 35 pieds) de haut, plus de 3 centimètres (un pouce) de

coeur ou de vrai bois: aussi les couches concentriques sont-elles extrêmement espacées dans ce Pin, et c'est ce qui explique la grande rapidité avec laquelle il croît, surtout dans les Etats méridionaux, où j'ai le plus souvent fait cette observation. En Virginie où il vient dans des terreins plus secs, et par conséquent moins rapidement, il n'a pas autant d'aubier, et son bois est d'une contexture plus compacte."

Elliott (p. 636) summarized his account: "but the heart or real wood is much smaller in proportion to its diameter, and even in its best state it is very inferior". So, even though upland (rather than marsh or lowland) stands of *P. Taeda*, especially in Virginia, are now sources of valued timber, the original swamp-grown trees could well have merited Miller's "I have not heard the wood was of any use but for fuel".

While she was in England the junior author was not able to get at any of Miller's material of *Pinus palustris*. However, Dr. George Taylor has obligingly hunted for this material and, though he found no indication that there ever was an actual type of Miller's, he writes: "At Tring. . . . I . . . found an old specimen from Dr. Collinson's Garden at Millhill which it is just possible Miller saw. The sheet is inscribed on the back 'Hort. Drs' Collinson ad Millhill'. The sheet is written up 'Pinus palustris Swamp Pine' in an old hand which, unfortunately, is now hardly legible. I have compared the writing with that of Philip Miller and, though there are certain minor discrepancies, it is possible that he may have put the identification on the sheet. I have mounted two spur shoots from this specimen and send them herewith."

These fascicles and their sheaths, 8 to 8½ inches long (not "a foot or more in length", as stated by Miller), are readily matched by those of *Pinus Taeda* but not by those of the Long-leaf Pine; they could be from Pond Pine, *P. serotina* Michx., but not so well from *P. cubensis*. That the only possibly authentic material of *P. palustris*, bearing that name in a hand only doubtfully Miller's, was from a cultivated specimen of *P. Taeda* L. seems fairly apparent, that species in its primitive habitat (before it became Old-field Pine) well justifying the name *P. palustris*. It is not without significance that Bean, in his remarkably detailed Trees and Shrubs Hardy in the British Isles, ii. 170 (1914), should have very definitely excluded from consideration some species "because their garden value is *nil*".

These include "P. PALUSTRIS *Miller* (P. australis, *Michaux*) . . . too tender to succeed well in our climate" and *P. Taeda* which "can only be grown in the mildest parts of our islands". If Miller's very mixed and indefinite account, based largely on hearsay, stood for a definite species it probably did not include Long-leaf Pine, "too tender to succeed well", and there is no evidence (at least in Bean's synopsis) that the more southern and largely tropical *P. cubensis* was ever grown in England. It seems right, therefore, to follow F. A. Michaux, Loudon, Spach, Endlicher, Lindley & Gordon, Dietrich, Chapman, M. A. Curtis, Parlatore, Engelmann, Small and others in calling Long-leaf Pine PINUS AUSTRALIS Michx. f. That name is absolutely definite; *P. palustris* hopelessly indefinite.[1]

CLEMATIS CANADENSIS Mill. Gard. Dict. ed. 8, no. 5 (1768) is represented by characteristic foliage-material and a flowering spray of *C. virginiana* L. (1753). Miller stated that "the seeds do not ripen in England, unless the season is very warm. There is little beauty in this sort." The fact that his material was staminate may account for the "little beauty" of his plant.

FRAXINUS CAROLINIANA Mill. Dict. ed. 8, no. 6 (1768) was rather vaguely described by Miller:

> 6. FRAXINUS (*Caroliniana*) integerrimis petiolis terretibus fructu latiore. Prod. Leyd. *533*. *Ash-tree with entire leaves and taper foot-stalks*. Fraxinus Caroliniana, latiore fructu. Rand. Cat. H. Chels. *Carolina Ash with a broad fruit.*

Miller also stated:

> The sixth sort was raised from seeds which were sent from Carolina in the year 1724, by Mr. Catesby. The leaves of this sort hath seldom more than three pair of lobes, the lower being the least, and the upper the largest; these are about five inches long and two broad, of a light green colour, and slightly sawed on their edges; the foot-stalk, or rather the midrib, of the leaves is taper, and has short downy hairs; the seeds are broader than those of the common Ash, and are of a very light colour. As this sort hath not yet produced seeds in England, it is propagated by grafting it upon the common Ash.

Florae Leydensis Prodromus by Royen (1740), cited by Miller, has simply the two citations later given by Linnaeus for his mixed *F. americana* (see p. 168). In other words, the latter references were to two quite different species, since the Gronovian account was based upon a specimen of conventional *F. americana*

[1] Since this discussion went into type Dr. E. L. Little, in Phytologia, ii. 457, 458, July, 1948, has urged the retention of the name *Pinus palustris* in place of *P. australis*.

L. (1753), while the Catesby plate is of the species generally interpreted as *F. caroliniana.*

In the herbarium of the British Museum of Natural History there is a sheet which has sometimes been taken to be the type of *F. caroliniana* (our neg. 110) and which reflects the confusion which has prevailed from the first; for this specimen, bearing the identification, apparently in Miller's hand, *F. caroliniana,* is a characteristic fruiting branch of *F. pennsylvanica* Marsh. In view of Miller's statement that his *F. caroliniana* had not fruited in England this specimen with abundant fruit can hardly be taken as the type of Miller's species! Incidentally, Miller's emphasis on the broad fruit is certainly not applicable to the unusually slender-based and narrow samaras of *F. pennsylvanica.* Furthermore, when Lamarck described his *F. pubescens* Lam. Encycl. ii. 548 (1786) he gave a detailed description of the flowers, *F. pubescens* being identical with *F. pennsylvanica.* Even though an authentic specimen of Miller's species may yet be found, the facts, that the seeds were sent by Catesby and the fruit described as broad, are fair justification for the general interpretation of Miller's species, which for want of a known type is exemplified in the Catesby plate.

The inclusive *F. caroliniana* of the southern Coastal Plain and Cuba is extremely variable, especially in outline of leaflets, degree of pubescence and shape of samara, and upon these characters many species and varieties have been proposed. A study of the assembled material in the Gray Herbarium and that of the Arnold Arboretum indicates that the species may appropriately be treated as consisting of its primary element and two fairly marked geographical varieties, but that otherwise the minor variations, such as three-winged fruits and fluctuating pubescence, are not of such strong character. In all three varieties glabrous and pubescent foliage occur and in the commonest and typical variety the fruits may be flat and two-winged, concave and spoon-shaped or definitely three-winged. In regard to this point the late M. A. Curtis, who certainly knew the trees of North Carolina, wrote when defining his two varieties of *Fraxinus platicarpa* Michx. (which is identical with *F. caroliniana*): "These varieties, like the more common form, frequently have the samaras three winged". In the material with three-winged

samaras two-winged fruits often occur in the same inflorescence, while on those which bear concave and spoon-shaped fruits flat samaras are often found. These variations are in the nature of sports rather than true varieties or forms.

Briefly summarized the three seemingly significant varieties are:

F. CAROLINIANA (typical).—Petioles and rachis glabrous; lower leaflet-surface glabrous or only sparsely pilose along nerves; fruit broadly oblong-oblanceolate to rhombic or sub-elliptic, either obtuse or acutish, 1–2 cm. broad, 2.5–4.5 cm. long.—Swamps, low woods and pond-margins, Florida to eastern Texas, north on Coastal Plain to southeastern Virginia and Arkansas.—*F. caroliniana* Miller, Gard. Dict., ed. 8, no. 6 (1768). *F. americana* sensu Marsh. Arbust. Am. 50 (1785), not L. (1753). *F. excelsior* sensu Walt. Fl. Carol. 254 (1788), not L. (1753). *F. platicarpa* Michx., Fl. Bor.-Am. ii. 256 (1803); Michx. f. Hist. Arb. Am. iii. 128, t. xiii (1813). *F. triptera* Nutt. Gen. ii. 232 (1818) and Am. Sylva, iii. 62, t. C [large fruit at left] (1849). *Samarpses triptera* (Nutt.) Raf. New Flora, iii. 93 (1838). *Fraxinus americana* L., var. *caroliniana* (Mill.) D. J. Browne, Trees of Am. 398 (1846). *F. americana*, var. *triptera* (Nutt.) D. J. Browne, l. c. 399. *F. nigra* Marsh., subsp. *caroliniana* (Mill.) Wesmael in Bull. Soc. Bot. Belg. xxxi. 113 (1892). *F. caroliniana* Mill., var. *platicarpa* (Michx.) Lingelsh. in Engl., Bot. Jahrb. xl. 221 (1907).

Forma **pubescens** (M. A. Curtis), stat. nov.—Petioles, rachis and lower surface of leaflets tomentose.—Occasional with the tree with glabrous leaflets.—*F. platicarpa* Michx., β. *pubescens* M. A. Curtis in Am. Journ. Sci. ser. 2, vii. 408 (1849), ISOTYPE in Gray Herb. *F. Rehderiana* Lingelsh. in Engl., Pflanzenr. iv^{243}. 42 (1920), ISOTYPE in Herb. Arn. Arb. *F. caroliniana* Mill., var. *Rehderiana* (Lingelsh.) Sarg. in Journ. Arn. Arb. ii. 173 (1921). *F. caroliniana* Mill., var. *pubescens* (M. A. Curtis) Fern. in RHODORA, XXXIX. 442 (1937).

Var. **oblanceolata** (M. A. Curtis), comb. nov.—Foliage glabrous or essentially so; samaras oblanceolate, either obtuse or acute, 1–1.3 cm. broad, 3.5–5.5 cm. long.—Less common, Florida to southeastern Virginia.—*F. platicarpa* Michx., γ. *oblanceolata* M. A. Curtis in Am. Journ. Sci. ser. 2, vii. 408 (1849), ISOTYPE in Gray Herb. *F. pauciflora* Nutt. Am. Sylva, iii. 61, t. C [excl. 3-winged samara] (1849). *F. platicarpa* Michx., var. *floridana* Wenzig in Engl., Bot. Jahrb. iv. 185 (1883), ISOTYPE in Herb. Arn. Arb. *F. Nuttallii* Buckley in Proc. Phil. Acad. 444 (1860). *F. hybrida* Lingelsh. in Engl., Bot. Jahrb. xl. 220 (1907), portion of TYPE in Herb. Arn. Arb.

Curtis's description of his *F. platicarpa*, γ. *oblanceolata* read

"Glabrous. Samaras oblanceolate" and he stated that he had received it from the region of Santee Canal, sent by Ravenel. Such a sheet from Santee Canal is in Ravenel's herbarium at Converse College and a fragment from it is in the Gray Herbarium. Its fruit is like that illustrated by Nuttall for his *F. pauciflora* and by Lingelsheim for his *F. hybrida*.

The following are characteristic northern specimens: VIRGINIA: swamp bordering West Neck Creek, west of Pungo, Princess Anne County, *Randolph & Randolph*, no. 500; siliceous and argillaecous alluvium bordering cypress-swamp, bottomland of Nottoway River, above Cypress Bridge, Southampton County, *Fernald & Long*, no. 6335; wooded bottomland on Fontaine Creek southeast of Taylor's Millpond, Greensville County, *Fernald & Long*, no. 10,391.

Var. OBLANCEOLATA, forma **hypomalaca,** f. nov., foliolis subtus tomentosis.—Local.—The following specimens have been examined: VIRGINIA: cypress-swamp, wooded bottomland, Fontaine Creek, southwest of Haley's Bridge, Greensville County, June 9, 1946, *Fernald & Moore*, no. 15,139 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.). SOUTH CAROLINA: Santee River-swamp, *H. W. Ravenel.* LOUISIANA: without further locality, *Hale* (fruit 3-winged).

Var. CUBENSIS (Griseb.) Lingelsh.—Leaflets glabrous or sparsely pilose beneath; samaras narrowly oblanceolate, 5–9 mm. broad, 3–5 cm. long.—Cuba and Florida and presumably farther north.—*F. cubensis* Griseb. Cat. Pl. Cub. 170 (1866). *F. caroliniana* Mill., var. β. *cubensis* (Griseb.) Lingelsh. in Engl., Bot. Jahrb. xl. 221 (1907). *F. viridis* Michx., var. *Berlandierana* sensu Wright et Sauvalle, Fl. Cub. 88 (1873), not var. *Berlandieriana* Torr. (1859).

Although Grisebach originally cited no number, Wright and Sauvalle, citing *Fraxinus cubensis* as a synonym of *F. viridis*, var. *Berlandierana*, gave only one number, *Wright*, no. 3624. The specimen of this number in the Gray Herbarium has leaflets pilose on the nerves beneath, while all other material from Cuba and from Florida has quite glabrous leaflets.

Var. CUBENSIS, forma **lasiophylla,** f. nov., ramulis petiolis rhachibus et paginis inferioribus foliolorum dense tomentosis.—VIRGINIA: upper border of sandy and peaty shore of Darden's Pond, north of Courtland, Southampton County, September 15 and 16, 1946, *Fernald, Long & Clement*, no. 15,335 (TYPE in Herb. Gray.; ISOTYPE in Herb. Phil. Acad.).

At Darden's Pond var. *cubensis*, forma *lasiophylla* is far re-

moved geographically from typical glabrous or subglabrous var. *cubensis* which, in the two herbaria studied, is represented only from Cuba and very slightly from Florida. The weakness of these herbaria in material from the Coastal Plain of Georgia and the Carolinas may account for its seeming absence from the intermediate broad belt. Forma *lasiophylla* differs from typical var. *cubensis* only in the dense pubescence, a character which in the two commoner varieties seems only formal.

Prunella caroliniana Mill. Gard. Dict. ed. 8, no. 6 (1768), described "foliis lanceolatis integerrimis . . . petiolatis" etc., is represented by a characteristic specimen of *P. vulgaris* L., var. *lanceolata* (Barton) Fernald in Rhodora, xv. 183 (1913). Hultén treats this plant as a subspecies; should it be treated as a species, Miller's binomial would be the proper name. P. anglia Mill. l. c., no. 7, is characteristic introduced *P. vulgaris* L. His P. canadensis, l. c. no. 4, is surely not a *Prunella*. The photograph of a very distinctive species which accords with Miller's description of a plant which "grows naturally in North America" has yet to be matched.

Eupatorium ramosum Miller, Gard. Dict. ed. 8, no. 13 (1768), which "grows naturally in Maryland", is represented by a very characteristic specimen of *E. altissimum* L. Sp. Pl. ii. 837 (1753). Since Gray (Syn. Fl.) does not mention Miller's species and Index Kewensis maintains it as a kept-up species, its identity seems not previously to have been established. The photograph shows, not only the habit and inflorescence, but the obtuse linear-oblong phyllaries of *E. altissimum*.

Helianthus ramosissimus Mill. Gard. Dict. ed. 8, no. 8 (1768) is represented by a freely branched specimen of *H. decapetalus* L. (1753). Miller's "foliis lanceolatis" for this and for his no. 7, H. trachelifolius would have been more descriptive of his types if changed to lanceolato-ovatis.

Part IV. Some Species of Thomas Walter
(Plates 1103–1115)

Thomas Walter's own herbarium, on which he based his Flora Caroliniana (1788), was early destroyed, but he had given fragments of many of his plants to his publisher, John Fraser (1750–1811) of London, these, so far as known, being essentially

CUCUBALUS POLYPETALUS Walt., basis of SILENE POLYPETALA (Walt.) Fernald & Schubert = *S. Baldwynii* Nutt.: FIG. 1, Walter's type, × ½; FIG. 2, *S. Baldwynii:* two inflorescences, × 1, from Aspalaga, Florida, *Chapman.*

SAPONARIA OFFICINALIS L., to which Asa Gray referred the Walter type: FIG. 3, portion of inflorescence, × 1, from Enfield, Massachusetts, July 22, 1931, *Goodale, Potsubay and St. John.*

all that exist to show what Walter was describing. John Fraser, senior, passed the collection on to his son and namesake (1799–1860?), who, on May 23, 1849, presented it to the Linnean Society of London, where, as not the work of Linnaeus, it was treated as a "Surplus Collection" (fortunately not as mere rubbish) and sold to the British Museum of Natural History in 1863 for the sum of 15 shillings. This collection, constituting a folio volume of 117 pages, each page with several scraps pasted on, is now carefully safeguarded at South Kensington. According to the detailed account of it by the late James Britten[1] it was studied by only a few American botanists before it reached the British Museum: by Pursh and by Gray but few, if any, others. Numerous recent students have studied Walter's plants and in 1915 Blake discussed in detail several of his species, in RHODORA, xvii. 129–137; the senior author and Mr. Bayard Long studied them in 1930 and the junior author in the winter of 1946–47 made detailed studies of many heretofore unconsidered specimens and photographed the whole series, her results now in a very plump volume on the shelves of the Gray Herbarium. Blake and, after him, Britten have commented on the absence of some of Walter's species from the Fraser volume and the very confused and often quite misleading names which are attached to many specimens; and Britten pointed out that the small specimens and their labels, too often in the hand of one of the Frasers, rather than of Walter, had obviously been cut from their earlier place of mounting and had been remounted in alphabetical order, according to the often wholly erroneous identifications which the mounter (presumably one of the Frasers) had seen fit to place with them. Thus perfectly obvious *Oxalis* is called *Pinguicula* and characteristic *Pinguicula* is called *Utricularia*. On the other hand, a large proportion of the labels are correctly placed, such distinctive species as *Arethusa racemosa* (*Ponthieva*), *A. divaricata* (*Cleistes*), *Cypripedium reginae* or *Eupatorium fusco-rubrum* being properly labeled. As others have pointed out, however, the labels, as they now stand, must be partly ignored and the effort directed to matching the fragments with Walter's descriptions. This we have done in some

[1] See James Britten in Journ. Bot. lix. 69–74 (1921). For an enumeration of articles regarding Walter and his collections see Maxon in Smithsonian Misc. Coll. xcv. no. 8 (1936).

cases and the results are presented in the following pages and plates; many others, not yet worked out, must await future study.

The earliest very critical study of this Fraser series of Walter's plants was, evidently, that of Frederick Pursh; the next by Asa Gray, on his first European trip, in 1839. Gray, most fortunately, left a note-book containing his identifications, although he was inclined to doubt the value of the collection on account of the confusion of labels. To what extent the Fraser series had been tampered with, aside from the remounting and the misidentifications, we can not say, but some of the authentic specimens were surely removed. Thus Gray in 1839, made memoranda which, though already published, may be here repeated, the first from Rhodora, xli. 537, footnote (1939). "Gray noted under *Clematis holosericea*, which Pursh described from '*Herb. Walter*': 'There is nothing in Walter's herb. to correspond to this . . . Pursh must have carried off the specimen, or part of it'. Then follows in another ink: 'P. S. He has taken it all to herb. Lambert—which see'. Pursh and his patron, Lambert, were not the only early botanists who felt that Walter's plants would be of better service elsewhere (for instance, see note on *Lobelia glandulosa* by Fernald & Griscom, Rhodora, xxxix. 497)". The latter note was as follows, this after the statement that nothing could be found in 1937 in Walter's herbarium to match his description of *L. glandulosa*. "However, in the Gray Herbarium there is a full raceme of such a plant, with definitely dentate calyx-lobes, which was labeled by Asa Gray as follows; '*Lobelia* Walt. *L. glandulosa* fl.! Cf. no. 2 in notes.' This specimen is in a pocket labeled in Gray's hand: 'Herb. Walter! See notes.'

"The pertinent facts are as follows. Asa Gray examined the Walter Herbarium in February, 1839, and left a small book of notes upon it. Under *Lobelia glandulosa* there is the following comment: 'I take fl. fr. specimen verum, but the cal. segments are entire. A loose spec. without specific name—a smooth plant—agrees better with descr [iption] as to calyx (no. 2).' It becomes apparent, therefore, that the only element which Walter had with '*calycis laciniis dentatis*' was given to Asa Gray. In view of the fact that this is the only extant type of the Walter

THERMOPSIS VILLOSA (Walt.) Fernald & Schubert, all figs. × 1½: FIG. 1, TYPE of *Sophora villosa* Walt.; FIGS. 2 and 3, portions of inflorescence of *Thermopsis caroliniana* M. A. Curtis, from mountains of North Carolina, 1842, *Buckley;* FIG. 4, portion of inflorescence of *T. caroliniana* from near Highlands, Macon Co., North Carolina, *Biltmore Herb.*, no. 1332[b].

BAPTISIA CINEREA (Raf.) Fernald & Schubert: FIG. 5, portion of inflorescence, × 1½, from Franklin, Virginia, 1867, *W. M. Canby*, the species erroneously supposed to be *Thermopsis villosa* Walt.

plant with dentate calyx-lobes, the plant definitely accepted by Elliott, Gray and McVaugh as *L. glandulosa,* the name should stand for this element. A portion of the inflorescence has been returned to the British Museum." If anything is now removed from the Fraser volume we shall know about it; we have a complete photographic reproduction of all the pages.

MELANTHIUM HYBRIDUM Walt. Fl. Carol. 125 (1788), is often cited with a mark of interrogation as probably synonymous with *M. latifolium* Desr. in Lam. Encycl. iv. 25 (1796), the latter collected in Virginia by Fraser and described with "Les pétales . . . unguiculés, à onglets presqu'aussi longs que les lames. Celles-ci ont une forme pour ainsi dire orbiculaire, & paroissent légèrement ondulées sur les bords." A photograph of Desrousseaux's TYPE before us shows it to be correctly understood. We feel, however, that Walter's earlier name was given to the same species. Walter divided *Melanthium* into two series, the first with "Petalis unguiculatis imprimis albis demum obscuro-rubris seminibus *semi ovatis*", the second "Petalis sessilibus, seminibus *ovatis*", the second series containing plants now referred to *Amianthium*, *Tofieldia*, etc. Walter's *M. hybridum*, with unguiculate petals and semi-ovate seed, was further described "petalis plicato-undulatis mmaculatis [evident misprint], floribus masculis et foemineis mixtis". One has only to look at representative specimens of *M. latifolium* and at the illustration (fig. 982 in ed. 1, fig. 1236 in ed. 2) in Britton & Brown in order to see a depiction of the "petalis plicato-undulatis" and an inflorescence "floribus masculis et foemineis mixtis". The species occurs in both the Carolinas and the detailed illustrations in Small's Manual show nothing else in the South which could have been meant by Walter. We are taking up M. HYBRIDUM Walter. It was recognized by Elliott, who gave a detailed description of a specimen received from Georgia, with "sterile and fertile flowers intermingled in each panicle. *Petals* persistent, orbicular, plaited, the margins waved or repand."

PANCRATIUM CAROLINIANUM Walt. Fl. Carol. 120 (1788), is represented by an unusually well prepared inflorescence, showing the very large crown with stamens borne at the summits of the broad lobes exactly as in the Carolinian and Georgian *P. coronarium* LeConte in Ann. Lyc. N. Y. iii. 145, t. 4, figs. 7–9 (1830),

which "Inhabits in Savannah river, at the rapids, a few miles above Augusta, where it covers the rocky islets. I have also seen it in the Congaree river, at Columbia, in South Carolina, occupying similar situations." Marc Catesby had a beautiful plate of the plant, the large crown and other characters as shown in the Walter specimen and in LeConte's figures, Catesby calling it *Lilio-Narcissus Polianthus, flore albo*, Catesby Carol. ii. Append. 5 (1754), he saying "These Plants I saw growing in a bog near *Palluchucula*, an *Indian* town on the *Savanna* river, within the precinct of *Georgia*." The Catesby account and plate became the basis of *Hymenocallis caroliniana* Herbert, Append. 44 (1821), Herbert making no reference to Walter. *H. caroliniana* Herbert, was, then, identical with and found in the same region as Walter's *Pancratium carolinianum* but not based upon it. The later *Hymenocallis coronaria* (LeConte) Kunth (1850) should, therefore, be called

HYMENOCALLIS CAROLINIANA Herbert, Append. (to Bot. Reg. vii), 44 (1821). *Pancratium carolinianum* Walt. Fl. Carol. 120 (1788). *P. coronarium* Le Conte in Ann. Lyc. N. Y. iii. 145, t. 4, figs. 7–9 (1830). *H. coronaria* Kunth, Enum. v. 855 (1850).

Index Kewensis does not clarify the situation by referring *Hymenocallis caroliniana* Herb. to the quite different Mediterranean *Pancratium maritimum* L., while *H. coronaria*, identical with and from the same region as *H. caroliniana*, is referred to the smaller-crowned *H. crassifolia* Herbert. It is evident that the names in the genus need clarification.

ASARUM CAROLINIANUM Walt. Fl. Carol. 143 (1788) is represented by no specimen but the description clearly indicates, as has been thought, some form of *A. canadense* L. (1753). A. VIRGINICUM sensu Walt., not L. (1753) is represented by a characteristic leaf of *A. arifolium* Michx. (1803) and it agrees with Walter's description.

POLYCARPON UNIFLORUM Walt. Fl. Carol. 83 (1788). The very clear description of this plant, with "foliis succulentis ellipticis humisparsis, pedunculis lateralibus unifloris", is so like that of Michaux's *Spergulastrum lanuginosum*, the basis of *Arenaria lanuginosa* (Michx.) Rohrb., that it seems wholly probable that the suggested identification of the two as one species by Robinson in Gray, Syn. Fl. i[1]. 240 (1897) was quite justified. Since the

ANONYMOS (Lupino affinis) ROTUNDIFOLIA Walt. = CROTALARIA ROTUNDIFOLIA (Walt.) Poir., as to basonym only, = *C. maritima* Chapm.: FIG. 1, Walter's TYPE, × ca. ⅓; FIG. 2, the TYPE, × 1; FIG. 3, plant of *C. maritima* Chapm., × 1, from Hillsborough Co., Florida, *Fredholm*, no. 6290.

name *Arenaria uniflora* is preempted no transfer of Walter's name to *Arenaria* is called for.

STELLARIA UNIFLORA Walt. Fl. Carol. 141 (1788), our PLATE 1103, FIGS. 1 and 2, has evidently been misinterpreted by Robinson in Gray, Syn. Fl. N. Am. i[1]. 237 (1897) and by later as well as some earlier authors. Robinson's description reads:

> "weak and slender: stems decumbent or suberect, a foot in length: leaves linear, acute, or the lower lanceolate, gradually narrowed below, mucronate, 8 to 12 lines [1.7–2.5 cm.] in length; the floral much reduced: flowers few, solitary, on elongated slender peduncles: calyx soft in texture, sepals scarcely veined", this species coming under a section with "Petals retuse or shortly bifid, divided only one fourth to one half the way to the base", etc.

Small, calling the plant of Robinson's treatment *Sabulina uniflora* (Walt.) Small, gives (Man. 498) the following description:

> "Stems 1–3 dm. tall: leaf-blades linear, 1–4 cm. long, acute: pedicels 2–8 cm. long: sepals lanceolate, 4–5 mm. long, acute: petals linear-cuneate, 6–8 mm. long: seed 0.5 mm. long, minutely roughened. [*Stellaria uniflora* Walt.]—Meadows or springy places, Coastal Plain and adj. provinces, Fla. to Ala. and N. C.—Spr."

There is no question about what plant Robinson and, after him, Small intended by *Stellaria uniflora* or *Sabulina uniflora*, a paludal species illustrated in our PLATE 1104; but that it is what Walter had before him and described is very seriously doubted. Walter, calling his species a *Stellaria* because of the emarginate petals, his *Arenaria* having "Petala 5 integra" (Walter having the characters, as now understood, reversed), gave a description which is scarcely applicable to the plant of Robinson and of Small, for the latter weak and paludal species has dilated and fleshy leaves, glabrous calyx and rather deeply notched petals. Here was Walter's account:

> *uniflora* I. foliis subulatis oppositis; pedunculis alternis unifloris foliis triplo longioribus; calycibus subhirsutis (non striatis) petalis calyce longioribus, albis, emarginatis; capsulis ovatis.

Such a description, emphasizing the *subulate* leaves, subhirsute calyx and merely emarginate petals, certainly would be misapplied to the plant generally called *Stellaria* or *Sabulina uniflora* but, most fortunately, Fraser had a good specimen (our PLATE 1103, FIGS. 1 and 2) of a plant marked by him "No Name"

(on p. 100) which to us seems to be what Walter described. This has subulate leaves, and specimens (FIG. 3) which closely match it have the plane sepals somewhat glandular-hispidulous ("calycibus subhirsutis (non striatis)"). Asa Gray, examining this page, made the memorandum in his notes that the specimen marked "No Name" looked like *Arenaria brevifolia* Nutt. The Walter diagnosis and the specimen which it matches are certainly of the latter species, as Gray indicated. Small's figures on page 499 of his Manual, illustrating *Sabulina*, were evidently made from *S. brevifolia* (Nutt.) Small, they showing the details of flower and fruit of *A. brevifolia:* the white-margined blunt sepals with hispidulous back, the emarginate petals and the ovoid capsule slightly exceeding the calyx[1] ("calycibus subhirsutis (non striatis) petalis calyce longioribus, albis, emarginatis; capsulis ovatis".—Walter).

From Index Kewensis one would assume that the name *Arenaria uniflora* was used for a species by Poiret, Encycl. vi. 375 (1804), but Poiret was not describing a species but a minor variation of *A. recurva* Allioni as "β. *Arenaria* (uniflora)", this plant treated by such authors as Schinz & Thellung or Ascherson & Graebner as a trivial variation, with no binomial cited in their bibliography.

There is, however, an earlier *Arenaria uniflora* which was properly described as a new species, so that Walter's *Stellaria uniflora* cannot be transferred to *Arenaria.* The name in question is *Arenaria uniflora* Luce, Topogr. Nachr. Oesel, 141 (1823). This volume by Luce or Lucé seems to be very rare and its contents often unknown even to botanists of the Baltic area. Thus, Fenzl in Ledebour, Fl. Ross. ii. 167 (1843) cites with doubt "Arenaria uniflora. LUCÉ *Fl. osil.?*", while some other writers on the region, even in modern works on the flora of Oesel, do not mention the author or his species. The name of the author, likewise, seems to vary. On the title-page of the *Topographische Nachrichten von der Insel Oesel* he appears as "*Dr. Joh. Wilh. Ludw. v. Luce*". On the secondary title-page, *Prodromus Florae osiliensis*, his name is similarly given, and the long Vorrede

[1] Although Small's artist well displayed the entire blunt sepals and the emarginate petals, the author or printer of Small's description got badly tangled, the text reading "sepals . . . truncate or emarginate: petals spatulate or obovate: spatulate, 4–5 mm. long".

is signed Dr. *v. Luce*. Pritzel, however, lists him as Lucé and such of his binomials as were caught in Index Kewensis are ascribed to Lucé.

The Prodromus is very rarely represented in American libraries. For an opportunity to examine a copy we are indebted to the courtesy of the Librarian of the University of Chicago.

As to the plant treated by Torrey & Gray and by Robinson as *Stellaria uniflora* and by Small as *Sabulina uniflora*, some earlier authors were much confused. Thus, Elliott, Sk. i. 520 (1821), described as *A. glabra* Michx. (which Small assigns to "Cliffs, Blue Ridge and Appalachian Plateau") a plant which "Grows in the swamps of the Santee river, from Murray's to Nelson's Ferry. Dr. Macbride", and cited *Stellaria uniflora* Walt. as an unquestioned synonym. The plant of swamps of the Santee River, as shown by characteristic material collected by Ravenel as "*Arenaria glabra*" but marked by Gray as *Stellaria uniflora*, is the paludal plant of Torrey & Gray, Robinson and Small. Although Gray, supposing the latter to be Walter's *Stellaria uniflora*, renamed it *Alsine Walteri* Gray, Genera, ii. 34 (1849)—*Alsine* "Walteri (Stellaria uniflora, *Walt.*)", his new name must apply nomenclaturally to the plant of Walter, not to the one mistakenly taken for it. The paludal species should evidently be called

STELLARIA **paludicola,** sp. nov. (TAB. 1104), planta stolonifera stolonibus filiformibus diffusis repentibus; caulibus laxe adscendentibus vel diffusis pergracilibus ad 4 dm. longis glabris deinde ramosis; foliis linearibus vel oblanceolatis glabris primariis 1.5–4 cm. longis 1–4.5 mm. latis acutis; pedunculis axillaribus vel terminalibus valde adscendentibus 2–8 cm. longis; sepalis glabris lanceolatis acuminatis 3–5 mm. longis; petalis anguste cuneatis 6–10 mm. longis apice emarginatis; staminibus petalis brevioribus.—Shallow streams, pools, wet meadows, boggy depressions and grassy swamps, Florida and Alabama, north along the Coastal Plain to North Carolina. TYPE: edge of small stream, golf-links, Myrtle Beach, South Carolina, April 19, 1932, *Weatherby & Griscom*, no. 16,523 (in Herb. Gray.).

CUCUBALUS POLYPETALUS Walt. Fl. Carol. 141 (1788), under a genus defined "*Cal.* inflatus. *Petala*, fauce nuda. *Caps.* 3-locularis", was, obviously a *Silene*. The species was very briefly characterized:

polypetalus. foliis oppositis, ovato-lanceolatis; floribus polypetalis.

Asa Gray, in manuscript memoranda, as well as beside the specimen in the Fraser volume, stated that it is *Saponaria officinalis* with double flowers; but the specimen, no. 112 on page 38 (our PLATE 1105, FIG. 1) is quite evidently the summit of a flowering stem of *Silene Baldwynii* Nutt. Gen. i. 288 (1818), originally described with "petals divaricately laciniate (FIG. 2), the very narrow laciniae rendered by Walter "polypetalis". The long and narrow segments of the petals are displayed in Walter's specimen (although crumpled) as well as in the specimens of *Silene Baldwynii*. They do not occur in the flowers of *Saponaria officinalis* (FIG. 3). Index Kewensis hit somewhat nearer by identifying *Cucubalus polypetalus* with *Silene ovata* Pursh, in this following a suggestion made by Pursh himself. That tall species, however, has long acuminate leaves, a prolonged thyrse of relatively small flowers with the slender calyx in anthesis only 6–10 mm. long. Walter's species has the small bluntish leaves, corymbiform inflorescence and large calyx (in anthesis 1.8 cm. long) of *Silene Baldwynii*. It is, therefore, necessary to call it

SILENE **polypetala** (Walt.), comb. nov. *Cucubalus polypetalus* Walt. Fl. Carol. 141 (1788). *Silene Baldwynii* Nutt. Gen. i. 288 (1818).

In view of Asa Gray's unfortunate identification of *Cucubalus polypetalus* with the very different *Saponaria officinalis*, we quote, as did the late James Britten (in Journ. Bot. l. c. 70 (1921)) from the Letters of Asa Gray, i. 136 (1893) and append Britten's remarks.

> "I . . . find the examination very tedious, as the specimens are very often not labeled, except with the genus in his 'Flora,' so that I have first to make out his own species, and then what they are of succeeding authors.
>
> "The specimens are mostly mere bits, pasted down in a huge folio volume. I suspect this was done by Fraser, and the labels have sometimes been exchanged, so that it requires no little patience. Some of the things I most wished to see are not in the collection, and there are several in the collection which are not mentioned in the 'Flora'. You would laugh to see what some of the things are that have puzzled us: thus, for instance, his 'Cucubalus polypetalus' is Saponaria officinalis! His 'Dianthus Carolinianus' is Frasera! in fruit."

Britten added:

> "Gray is probably right in his identification of the wretched specimen of '*C. polypetalus*' with *Saponaria*—though Pursh (Fl. Amer. Sept., 316) had doubtfully referred it to his *Silene ovata*, which is based on a speci-

Impatiens capensis Meerburgh, portion of original plate, × 1 = I. biflora Walt.

men in Herb. Banks endorsed: 'Cherrokee Countrey, W. V. Turner, 1769: Indian name Ounenake Ounostaatse—White root': but the *Dianthus* is not *Frasera*, but *Dodecatheon Meadia*. Gray made notes on the collection which, or a copy, he sent to Torrey; if these are anywhere preserved, their publication would be of considerable interest."

Without very careful checking, Gray's note-book, before us, might be misleading, since, at the age of 28 and with limited knowledge of southern plants, his identifications were often based on familiarity with the flora of eastern New York.

ACTAEA PENTAGYNA Walt. Fl. Carol. 151 (1788), although not represented by any preserved specimen, was presumably *Anemonella thalictroides* (L.) Spach. Walter's description is good:

pentagyna floribus solitariis, pedunculis e sinu foliorum
2. ortis; corollis petalis septem obovato-oblongis, albis; pericarpio lanceolato monospermo; foliis biternatis, foliolis obtusis tridentatis.

Except for the "pericarpio . . . monospermo" the description could apply to *Isopyrum biternatum* (Raf.) Torr. & Gray, but *Isopyrum* has follicles with more than 1 seed and it is not reported from east of the Alleghenies. *Anemonella* is common in southeastern Virginia and extends across western Carolina to northern Florida. Its lanceolate achenes are 1-ovulate and, though commonly 7 or more, are frequently only 3 (or even 2 or 1). The disposition by *Index Kewensis* of *Actaea "pentagyna*, Walt. Fl. Carol. 151 = Cimicifuga americana" is far from satisfactory.

CHRYSOSPLENIUM OPPOSITIFOLIUM sensu Walt. Fl. Carol. 140 (1788), is a striking illustration of Walter's isolation from comparative material and of the Frasers' inaccuracy in guessing at the identities of the fragments they had from Walter. Walter was in doubt as to both genus and species, accompanying a compiled generic diagnosis by the generic name "183. CHRYSOSPLENIUM?" and considering his plant as possibly *C. oppositifolium* L., a Eurasian herb resembling our *C. americanum*. How far from the Eurasian plant was Walter's is shown by his description:

oppositifolium? 1. foliis oppositis luteis tomentosis ovatis sessilibus, caule aureo tomentoso.

The marginal memorandum in the hand which was presumably that of Dr. James Macbride (see below) gives the clue, for this reads "Eriogonum tomentosum Michx." The Fraser scrap-

book contains no specimen marked *Chrysosplenium* but on p. 38 there is a broken-off branch of an inflorescence of *Eriogonum tomentosum* bearing Fraser's label "F. 306 Cucumis", etc., an even more unfortunate identification than Walter's. Since the lower leaf-surfaces of *Eriogonum tomentosum* become fulvous in age, it seems evident that *Chrysosplenium oppositifolium* sensu Walter, not L., belongs in the synonymy of that species.

As stated, our clue to the above identification was the marginal memorandum made, evidently by James Macbride, a South Carolinian and contemporary of Stephen Elliott, in the copy of Walter's Flora Caroliniana which belonged to him from 1812–1816 and which, after passing through various hands, originally from Thomas Walter to John Watson, then to James M. Watson in 1789, then to Macbride, through J. M. Watson's daughter, Mrs. Catharine Davis, then by James Macbride to Jacob Bigelow and on through Francis Parkman to Charles Sprague Sargent, was finally reproduced and issued by Dr. E. D. Merrill in 1947. The marginal memoranda, apparently in the handwriting of Macbride, who knew the flora of Walter's region, are very significant. As stated, it was he who detected what Walter meant by *Chrysosplenium*.

The Type of Sophora villosa Walt. Fl. Carol. 134 (1788), our plate 1106, fig. 1, was very briefly described as follows:

> *villosa* 3. fol. ternatis lanceolatis, caule calycibusque villosis, floribus cinereis spica terminali.

The species was transferred to *Podalyria* as *P. villosa* (Walt.) Michx. and then to *Baptisia* by Nuttall. Elliott, Sk. i. 468 (1817), expressed some doubt as to the identity of the plant, saying "It is not improbable that Michaux has described, under this name, a different species from that of Walter". Torrey & Gray, Fl. N. Am. i. 384 (1843), similarly indicated doubt: "We have drawn up our description from the specimen of Mr. Curtis, which we think is the same with the plant of Michaux. We are doubtful, however, whether it be the Sophora villosa of Walter, in whose herbarium a portion of a raceme of the plant only exists; and in this the calyx is more villous."

The Walter type (fig. 1) consists of a portion of a spiciform raceme with the flowers subsessile, each subtended by an oblong

bract when young. The rachis and calyces are densely spreading-villous and the plant obviously has nothing to do with that which currently passes as *Baptisia villosa* (FIG. 5). In its sub-sessile flowers, oblong bracts and heavily villous rachis and calyx it is, however, closely matched by specimens of *Thermopsis caroliniana* M. A. Curtis (FIGS. 2–4). Although the latter varies in having the inflorescence open or relatively dense, the inflorescence of the Walter plant is readily matched by specimens of *T. caroliniana* with more open inflorescences. It therefore becomes necessary to call *T. caroliniana*

THERMOPSIS **villosa** (Walt.) comb. nov. *Sophora villosa* Walt., Fl. Carol. 134 (1788). *Thermopsis caroliniana* M. A. Curtis in Am. Jour. Sci. ser. I, xliv. 80 (1843). PL. 1106, FIGS. 1–4.

IN PLATE 1106 FIG. 1 shows a portion of the inflorescence of Walter's plant, × 1½; FIGS. 2–4, portions of the inflorescence of *T. caroliniana*, from North Carolina, also × 1½; and FIG. 5, a portion of the inflorescence from Virginia of *Baptisia cinerea*, which has erroneously passed as the same as the Walter plant, also × 1½.

Since the binomial, *Baptisia villosa*, was based on a plant which was not conspecific nor even congeneric with what usually passes as *Baptisia villosa*, the latter plant requires a new name. The only available name published for it seems to be *Lasinia cinerea* Raf., New Fl. N. Am. ii. 50 (1837), clearly a substitute for the *B. villosa* of authors. Rafinesque's account was as follows:

> "333. LASINIA CINEREA Raf. B. villosa of Authors, stem and leaves beneath pubescent, stipules linear, leaves subsessile, folioles elliptic obtuse—in Carolina, Michaux says the flowers are pale, Elliot calls them grey."

This necessitates the combination:

BAPTISIA **cinerea** (Raf.), comb. nov. *Lasinia cinerea* Raf., New Fl. N. Am. ii. 50 (1837). *B. villosa* sensu Nutt., Gen. N. Am. Pl. i. 281 (1818) and later auth., not *Sophora villosa* Walt., basonym. PLATE 1106, FIG. 5, × 1½.

In her monograph of the genus *Baptisia* (Ann. Mo. Bot. Gard. xxvii. 181 (1940)), Larisey cites, in the synonymy of *B. villosa*, *Lasinia fulva* Raf. l. c. 49, described from "Tennessee and Arkanzas", but she states the range of her *B. villosa* "coastal plain of Virginia, south to South Carolina" (page 182), and describes as

a separate plant, ×*B. stricta* Larisey, l. c. 166, from Arkansas and Oklahoma, stating that this is the *B. villosa* of recent authors in part (as to the plant of Arkansas) and on page 131 she specially points out that the plant which has been mistakenly called *B. villosa* in Arkansas is really her newly proposed ×*B. stricta*. It seems probable that ×*B. stricta* is antedated by Rafinesque's *Lasinia fulva* which he called "A very distinct sp. probably blended among *B. villosa* . . ."

Anonymos (Lupino affinis) rotundifolia Walt. Fl. Carol. 181 (1788), our plate 1107, figs. 1 and 2, the *Crotalaria rotundifolia* Poiret (1811) as to basonym, has usually been identified with *C. ovalis* Pursh (1814) and later, by Senn in Rhodora, xli. 341 (1939), with *C. angulata* Mill. (1768). This identification of Walter's plant was made by Gray in 1839, he then recording in his manuscript-notes under *Lupino affinis* that "*rotundifolia!* = *ovalis*". At that time, of course, only the single rounded-leaved and decumbent species was recognized in the southeastern states, the plant now called *C. angulata*, with leaves elliptic or elliptic-oblong and strongly rounded at both ends, the new growth, rachis, calyces, etc. rufescent or fulvous with spreading villosity. Subsequently, *C. maritima* Chapman (1883) has been separated out, a similar plant with short and appressed pilosity, the leaves subcuneately tapering to but slightly rounded at base. This more localized species is cited by Small as extending from Florida northward on the Coastal Plain to North Carolina, and Senn cites characteristic material of it from the neighborhood of Savannah, close to Walter's territory. It is, therefore, significant that the very well preserved type or isotype of Walter's species on p. 67 of the Fraser volume (our figs. 1 and 2), which Gray examined, is of characteristic *C. maritima*. Walter's specific name was unfortunately selected but his "caule subdecumbente, foliis integris rotundatis pilosis" is all right if we take "rotundatis" to refer to the rounded summit of the leaf. The leaves of the preserved specimen from Walter exemplify Daydon Jackson's definition under "**rotund**', *rotund'us* (Lat., round), rounded in outline . . . but a little inclined towards oblong"! It would seem, then, that we must take up Walter's name in a different sense than has been done:

Crotalaria rotundifolia (Walt.) Poir. Encycl. Suppl. ii.

HYPERICUM DENTICULATUM Walt., var. TYPICUM = *H. angulosum* Michx. = *Brathys linoides* Spach = *H. virgatum ovalifolium* Britton = *H. denticulatum*, var. *ovalifolium* (Britton) Blake: FIG. 1 (right and left) TYPE of *H. angulosum* Michx. and of *Brathys linoides* Spach, × ½; FIG. 2, portion of a characteristic specimen from Walter's region, east of Andrews, Georgetown Co., South Carolina, *Godfrey & Tryon*, no. 156, × 1.

402 (1811), as to basonym, not as to plant described with "feuilles . . . arrondies, ... velues à leur insertion . . . ; pédoncules velus, un peu rousseâtres . . . bractées . . . velues; le calice velu"; not *C. rotundifolia* sensu later authors. *Anonymos rotundifolia* Walt. Fl. Carol. 181 (1788). *C. maritima* Chapm. Fl. So. U.S. ed. 2, Suppl. 614 (1883).

Var. **Linaria** (Small), comb. nov. *C. Linaria* Small, Man. Se. Fl. 679, 1505 (1933). *C. maritima*, var. *Linaria* (Small) Senn in Rhodora, xli. 347 (1939).

Hedysarum grandiflorum Walt. Fl. Carol. 185 (1788).—As Blake[1] pointed out, the name *Desmodium grandiflorum* (Walt.) DC., based on *H. grandiflorum* Walt., was incorrectly applied by American authors to *Desmodium glutinosum* (Muhl. ex Willd.) Wood (*D. acuminatum* (Michx.) DC.) for many years. On the basis of an examination and comparisons made of Walter's type at the British Museum by Mr. E. G. Baker, Blake recommended that the the name *D. grandiflorum* (Walt.) DC. be taken up for the plant long known as *D. bracteosum* (Michx.) DC. (and also, more correctly, as *D. cuspidatum* (Muhl. ex Willd.) Loud.). Recent examination of Walter's specimen, which is extremely fragmentary, confirms, nevertheless, the identity of his plant with those of Michaux and Muhlenberg.

In Rhodora, xxxviii. 96–97 (1936), Fassett showed that application of the homonym rule would preclude use of Walter's epithet, since it was a later homonym, antedated by *Hedysarum grandiflorum* Pall. (1773), and that, since a legitimate epithet was available in *Desmodium*, it must be used. The proper name to use for this species is, therefore,

Desmodium cuspidatum (Muhl. ex Willd.) Loud., Hort. Brit. 309 (1830) [incorrectly attributed to DC.]; Torr. & Gray, Fl. N. Am. i. 360 (1838).

Note on Impatiens biflora Walt. Fl. Carol. 219 (1788).—Apparently no type-material of this species is preserved, but a space on the page where it would be expected shows that a specimen has been destroyed. However, it seems to have been overlooked by American botanists that there is an earlier binomial which can hardly be set aside and which, without doubt, was based upon the familiar American plant. This was *Impatiens capensis* Meerburgh, Afb. Zeldz. Gewass. t. x (1775); Pl. Rar.

[1] Blake, S. F. in Bot. Gaz. lxxviii. 277, 278 (1924).

t. x (1789). Meerburgh, having cultivated plants in Holland, unfortunately assumed that they had originated at the Cape of Good Hope; but his beautiful life-sized colored plate is clearly that of *I. biflora* Walter which was published thirteen years later. Meerburgh's description was good:

> "IMPATIENS (Capensis) TAB. X.
> Planta annua, sub dio laete crescens, ad altitudinem quatuor pedum, caules lucide rubescunt, geniculatae, stabiles, rami alterni teretes, flores lutei intus rubro maculati;
> Habitus Impatientis Noli-tangere.
> Habitat ad Promontorium Bonae. Sp."

A portion of his plate, from the second reference cited above, is reproduced, without color, × 1, as our PLATE 1108.

Attention was directed to Meerburgh's species by G. M. Schulze in Notizbl. Bot. Gart. Mus. Berlin-Dahlem, xiii, nr. 120: 662–665 (1937), Schulze pointing out that *I. capensis* Meerb. is not the same as *I. capensis* Thunb., Prod. Fl. Cap. 41 (1794), the latter being a species actually of the Cape; while the former, although not positively identified by Schulze, was a plant unknown from the Cape, for which he suggested identity with Walter's species. Somewhat later B. L. Burtt, under the title "MEERBURGH'S IMPATIENS CAPENSIS", discussed the matter at length in Kew Bulletin for 1938, no. 4: 161–163, demonstrating by a study of the literature of the period that plate 10 was the last plate of the first part of Meerburgh's great illustrated work and that it was definitely published in 1775; Burtt saying in part:

> "A glance at the plate is sufficient to show that it is quite different from any of the South African balsams and it may, I think, be easily recognized as *Impatiens biflora* Walt. (*I. fulva* Nutt.), a common North American species now naturalized in several parts of Britain. There is no specimen of Meerburgh's now in existence and Schulze (l. c.) is of the opinion that the plate cannot be identified as *I. biflora* with absolute certainty; he therefore ranks *I. capensis* as 'species incerta'. Several botanists at Kew, however, have recognized the illustration of *I. capensis* as *I. biflora*, and there does not seem to be sufficient doubt to justify the rejection of Meerburgh's name. *I. capensis* Meerburgh (1775) clearly antedates *I. biflora* Walt. (1788) and must therefore stand as the correct name for the North American species, although the specific epithet is unfortunately quite inappropriate."

Since there seems no way to avoid the inappropriate binomial,

HYPERICUM DENTICULATUM Walt., var. RECOGNITUM Fernald & Schubert: portion of TYPE, × 1.

Impatiens capensis Meerb., it is necessary to make the following minor transfers:

I. CAPENSIS Meerb., forma **immaculata** (Weatherby), comb. nov. *I. biflora* Walt., f. *immaculata* Weatherby in RHODORA xix. 117 (1917).

Forma **citrina** (Weatherby), comb. nov. *I. biflora* Walt., f. *citrina* Weatherby in RHODORA l. c. 115.

Forma **albiflora** (Rand & Redfield), comb. nov. *I. fulva* Nutt., f. *albiflora* Rand & Redfield, Fl. Mt. Desert, 88 (1894); *I. biflora* Walt., f. *albiflora* (Rand & Redfield) Weatherby in RHODORA l. c. 115.

Forma **Peasei** (A. H. Moore), comb. nov. *I. biflora* Walt., f. *Peasei* A. H. Moore ex Weatherby in RHODORA l. c. 116.

Forma **platymeris** (Weatherby), comb. nov. *I. biflora* Walt., f. *platymeris* Weatherby in RHODORA xxi. 99 (1919).

HYPERICUM DENTICULATUM Walt. Fl. Carol. 190 (1788) is represented by no material but the description is a good one for the plant of the Coastal Plain from New Jersey to South Carolina which Michaux described as *H. angulosum* Michx. Fl. Bor.-Am. ii. 78 (1803). In fact, Michaux himself thought, correctly it would seem from his type of *H. angulosum* (our PLATE 1109, FIG. 1, × ½) and from abundant material from Walter's general region in eastern South Carolina (our PLATE 1109, FIG. 2), that his newly proposed species might be Walter's *H. denticulatum*. Walter's description of his species, standing between and allied to his *H. pilosum* (*H. setosum* L.) and his *H. quinquenervium* (*H. mutilum* L.), was as follows:

> *denticulatum* 5. floribus trigynis submagnis, petalis dente unico laterali, caule erecto quadrangulo, foliis subamplexicaulibus crassis ovatis.

Michaux's account of his *H. angulosum* was similar:

> ANGULOSUM. H. herbaceum, erectum, quadrangulum: foliis lanceolato-ovalibus, acutis: panicula dichotoma, distanter alterniflora: calyce inferne anguloso.
>
> *H. denticulatum?* WALT.
>
> *OBS.* HYPERICO *canadensi* paulo majus. Folia arcte sessilia, erectiuscula, 5-nervia. Flores pusilli; calyce subcampanulato; foliolis oblongis, inferne prominenti-carinatis.
>
> *HAB.* in paludosis Carolinae.

The short and narrowly oval or ovate leaves rounded to subamplexicaul bases and the broad sepals characterizing typical *H. denticulatum* (*H. angulosum*), contrasted with the mostly much

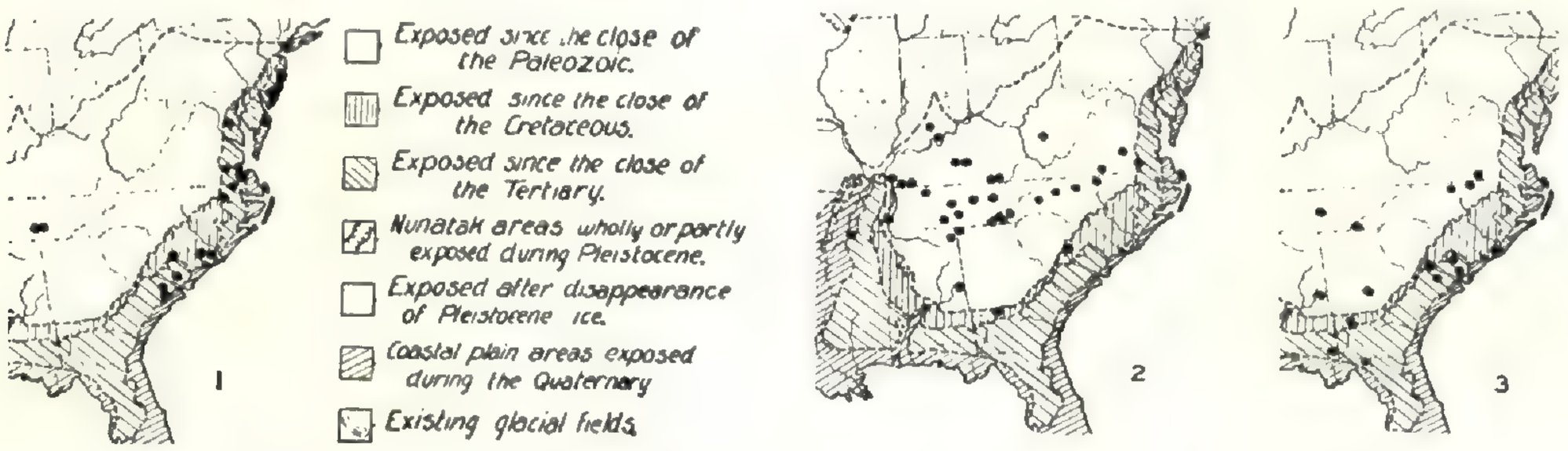
longer and narrowly elliptic-oblong leaves with acute or subacute bases of the plant which Blake in RHODORA, xvii. 134 (1915) treated as typical *H. denticulatum*. As synonyms of the plant with narrower and acute-based leaves Blake gave "*H. virgatum* Lam. Encyc. iv. 158 (1796); *H. angulosum* Michx."; and he treated the plant with short ovate or oval leaves, so frequent in the Pine Barrens of New Jersey, thence to the Coastal Plain of the Carolinas (the plant described by Walter and by Michaux) as "H. DENTICULATUM Walt. var. **ovalifolium** (Britton) Blake (*H. virgatum ovalifolium* Britton, Trans. N. Y. Acad. Sci. ix. 10 (1889)". Forthwith, as true *H. denticulatum* (originally described "foliis subamplexicaulibus. . . ovatis") there appears in Small, Man. 870 (1933) the plant with "leaf-blades elliptic or nearly so, 1–3 cm. long, acute (oval and relatively shorter, with the sepals oval to ovate, in *H. denticulatum ovalifolium*)".

As a matter of fact, true *H. denticulatum* has the larger round-based leaves only 0.8–2 (rarely –2.5) cm. long and mostly 0.6–1.7 cm. broad, while the reputed but obviously not typical "*H. denticulatum*" has the larger acutish- to acute-based leaves 1.5–3.5 cm. long and 4–10 mm. broad. This plant (our PLATE 1110), then, stands between short- and broad-leaved true *H. denticulatum* and the extreme with all or at least the upper nearly linear leaves sharply pointed, the upper cauline leaves (the lower ones often broader) 1–3.5 cm. long and only 1.5–7 mm. broad. The latter is *H. denticulatum*, var. *acutifolium* (Ell.) Blake, l. c., based on *H. acutifolium* Ell. Sk. ii. 26 (1821), Elliott's type, × ½, shown in our PLATE 1111, FIG. 2[1]. Had those who have recently pronounced on the identities here involved read Walter's "foliis subamplexicaulibus . . . ovatis" they would not have rendered it as "elliptic or nearly so" and then separated from it as a different variety plants with ovate or oval leaves; and they would not have placed Lamarck's *H. virgatum* (type shown, × ½, in our PLATE 1111, FIG. 1), which was correctly described: "feuilles . . . sessiles, amplexicaules, linéaires-lancéolees, étroites, un peu pointues, entières, . . . les plus grandes, d'environ un pouce sur une largeur de trois à quatre lignes", in the synonymy of the restricted *H. denticulatum*.

[1] The stained paper on which Elliott's type is preserved is due to the long storage, during and after the Civil War, of the herbarium in a damp basement.—See Weatherby in RHODORA, xl. 250 (1942).

HYPERICUM DENTICULATUM Walt., var. ACUTIFOLIUM (Ell.) Blake = *H. virgatum* Lam. = *H. acutifolium* Ell. = *H. Harperi* Keller: FIG. 1, portion of TYPE of *H. virgatum*, × ½; FIG. 2, TYPE of *H. acutifolium*, × ca. ½; FIG. 3, portion of COTYPE of *H. Harperi* × 1.

At least four numbers of *H. denticulatum*, var. *acutifolium* were distributed by Dr. R. M. Harper without identifications, as nos. 457, 1006, 1028 and 1731, from pinelands of Sumter County, Georgia. Evidently thinking that the labels needed completion, Dr. Robert Keller, who habitually assumed that our eastern North American plants awaited recognition[1], described three numbers as a new species, *H. Harperi* Keller in Engler, Bot. Jahrb. lviii. 198 (1923), he defining Harper's definitely soboliferous, soft-based herbaceous specimens as "suffruticosum, e rhizomate lignoso" and comparing them only with the strictly annual *H. Drummondii* (Grev. & Hook.) T. & G. Had he understood American botanical literature and plants he could have found it already described several times, beginning in 1797. A portion of a cotype (no. 1006)[2] of *H. Harperi* is shown, × 1, in PLATE 1111, FIG. 3. That it belongs with *H. denticulatum*, var. *acutifolium* seems apparent.



Ranges of (1) HYPERICUM DENTICULATUM, VAR. TYPICUM; (2) VAR. RECOGNITUM; (3) VAR. ACUTIFOLIUM.

Although the three varieties may merge and nondescript individuals can be found, while var. *acutifolium* is sometimes associated with the broader- and less attenuate-leaved plant in the southern part of their range, they are generally quite distinct and, as shown in the Gray Herbarium, they have distinctive areas. The maps here published show the localities of all specimens in the Gray Herbarium. They clearly indicate definite centers of development. The three varieties are

HYPERICUM DENTICULATUM Walt., var. **typicum.** *H. denticulatum* Walt. Fl. Carol. 190 (1788). *H. angulosum* Michx. Fl.

[1] See discussion of his new *Polygonum* by Fernald in RHODORA, xlviii. 53 (1946).

[2] Although Keller cited three numbers, he gave the detailed data for only one of them, no. 1028. This we, therefore, designate as the type.

Bor.-Am. ii. 78 (1803). *Brathys denticulata* (Walt.) Spach in Ann. Sci. Nat. sér. 2, v. 367 (1836), wrongly ascribed to Kunth: "B. DENTICULATA Kunth (sub Hyperico)". *B. linoides* Spach, Hist. Nat. Vég. v. 452 (1836), renaming (illegitimate) of *H. angulosum* Michx. *H. virgatum* var. *ovalifolium* Britton in Trans. N. Y. Acad. Sci. ix. 10 (1889). *H. denticulatum*, var. *ovalifolium* (Britton) Blake in RHODORA, xvii. 135 (1915).—Coastal Plain, New Jersey to South Carolina and presumably Georgia; Coffee Co., Tennessee. PLATE 1109. MAP 1.

Var. **recognitum,** var. nov. (TAB. 1110, × 1), foliis anguste ellipticis vel elliptico-oblongis vel anguste obovatis basin versus acutis apice acutis vel obtusis, laminis 1.5–3.5 cm. longis 4–10 mm. latis.—Georgia to Mississippi, northward (mostly in the upland and mountainous areas, barely reaching the inner margin of the Coastal Plain) to southeastern Virginia, southern West Virginia, Kentucky and southern Indiana. TYPE from moist ground, Knoxville, Tennessee, July, 1895, *A. Ruth* in Herb. Gray. MAP. 2.

This variety was taken by Blake and by Small to be typical *H. denticulatum*.

Var. ACUTIFOLIUM (Ell.) Blake, l. c. 134 (1915). *H. virgatum* Lam. Encyc. iv. 158 (1796). *H. acutifolium* Ell. Sk. ii. 26 (1821). *H. virgatum*, var. *acutifolium* (Ell.) Coulter in Bot. Gaz. xi. 106 (1886). *H. Harperi* Keller in Engler, Bot. Jahrb. lviii. 198 (1923).—Rather local, northern Florida, northward on Coastal Plain and upland to North Carolina, southern Virginia and central Tennessee. PLATE 1111. MAP 3.

Var. *acutifolium* is often much taller than the other varieties, large specimens up to 1 m. or more in height, whereas the other two varieties rarely exceed 6.5 dm. in height.

Although Coulter in Gray, Synopt. Fl. N. Am. i[1]. 288 (1897) cites unequivocally as a synonym of *Hypericum virgatum* Lam. the later *H. hedyotifolium* Poir. Suppl. iii. 700 (1813) from Nova Scotia, it is clear that Poiret's species could not have been any form of *H. denticulatum*. Poiret's "Espèce remarquable par sa délicatesse . . . hautes de quatre pouces, . . . les feuilles . . . linéaires, obtuses, droites, longues de quatre lignes, larges d'une ligne . . . ; les fleurs petites; . . . les bractées petites, lancéolées, aiguës: la corolle . . . plus courte que le calice", etc. indicate that he had tiny plants of *H. canadense* L., such as abound in Newfoundland and Nova Scotia.

(To be continued)

PODOSTEMUM, HIPPURIS AND HOTTONIA IN NEW HAMPSHIRE

A. R. Hodgdon and Stanley B. Krochmal

Podostemum ceratophyllum Michx. During the past two years, collections of this much overlooked species have been made from four streams in different New Hampshire townships. A diligent search in the literature and in herbaria has failed to reveal a solitary record for the species in the state up to now. However, *Podostemum* has been collected from all bordering states as well as the adjacent province of Quebec[1]. In Maine from the central part southward there are at least five known localities; in Massachusetts, at least two are well known; and in Vermont, one.

In recent years there has been an intensification of interest in the aquatic flowering plants of New Hampshire, partly at least, because of the prosecution of the "Waterway Improvement Survey for Waterfowl" by the State Fish & Game Department. In the course of the work, a majority of our streams, ponds and marsh-areas have been investigated systematically and a large number of new stations for some of the less common species have been discovered. Some of these "finds" are reported in this paper along with two stations for *Podostemum* discovered by University of New Hampshire biologists in the course of work quite unrelated to the "Survey".

The first of the *Podostemum* specimens to have been collected was from the township of Lee. Data on label reads: "Bed of Lamprey River between Wadleigh Falls and Long Hill, abundant for one-third of mile in fast water, June 27, 1946, *Hodgdon, Harrington and Jahoda*, No. 5335. Where the plants abounded the water averaged about 1 foot in depth during a moderately dry part of the year. However, plants were found growing on loose

[1] For the general distribution of *Podostemum* in Eastern North America, see Fassett, N. C. Rhodora 41: 525–526, 1939. This is not a complete listing of all known *Podostemum* stations in New England, though specimens from Maine, Massachusetts and Connecticut are cited. The map showing the distribution of *Podostemum* on page 257 in Muenscher's "Aquatic Plants of the United States" Comstock 1944 is incomplete, since it indicates stations in New England only in Maine (one dot) and Massachusetts (one dot). In all fairness to New England collectors we should point out that *Podostemum* has been represented for some time from every state in New England except New Hampshire in the Gray Herbarium and the Herbarium of the New England Botanical Club.

boulders and on apparent bed-rocks surfaces at depth of three to four feet on the same day and in the same general locality. Later on in September, 1946, a much less extensive colony was discovered in the township of Rochester at a swift, rocky place in the Isinglass River. Specimens of this collection, *Hodgdon* No. 5587, and of the Lee material as well are deposited in the Herbarium of the New England Botanical Club and of the University of New Hampshire. During July 1936 one other excursion to the Lamprey River above Wadleigh Falls disclosed *Podostemum* in a swift rocky part of the river on the Lee-Epping boundary. Further collecting at likely places in the major streams flowing into Great Bay should yield other stations.

On July 31, 1947, H. R. Siegler and Ernest Gould of the N. H. Fish & Game Department collected *Podostemum* in North Branch Brook in Antrim and about a week later the junior author and Sumner Dole, working on the "survey", discovered an area of the species in a particularly swift part of Beards' Brook in the township of Hillsborough (*Krochmal* No. 1015). On August 13, Krochmal and Dole visited the Antrim station and obtained excellent fruiting specimens (*Krochmal* No. 1040).

Hippuris vulgaris L. Three new stations in the state for this localized species were discovered during the 1947 season. At the Coös County stations in Pittsburg discovered by the junior author the species occurred in some abundance. Specimens were collected there from Scotts' Bog (*Krochmal* No. 1139). At East Inlet specimens were noted as occurring but none were collected. The other new locality for *Hippuris* is far to the south in Cheshire County—Highland Lake in the township of Stoddard. This was discovered by Ernest Gould. Svenson[1] reported the discovery of *Hippuris* immediately to the north of Stoddard in the township of Washington.

Specimens of *Hippuris* and of *Podostemum* from the stations herein reported, collected by representatives of the State Fish and Game Department, have been presented to the Herbaria of St. Anselm's College and the University of New Hampshire.

Hottonia inflata Ell. The junior author of this paper and Ernest Gould collected *Hottonia* from "Long Pond in Danville-

[1] Rhodora 31: 97, 1929.

Kingston on the 25th of June 1946". The plant was common. This specimen is in the Herbarium of St. Anselm's College. Also in 1946 *Hottonia* was observed, but not collected because its casual nature was not at that time suspected, in the Pow-wow River in Hampton and at Cub Pond in Sandown. Another locality, also in Sandown, New Hampshire, was reported several years ago by the senior author.[1]

University of New Hampshire
St. Anselm's College

A Model Flora of Nova Scotia.—The recently published Flora of Nova Scotia by Professor A. E. Roland[2] is a most welcome addition to the local floras of eastern North America. Provided with practical keys, characteristic drawings of many species and detailed maps of the occurrence in the province of most indigenous species, it is bound to be a much used volume. The introductory pages contain a clear statement of the geological and physiographic background so essential to a proper understanding of the flora, and the maps go outside in order to show the relation of the provincial flora to that of adjacent eastern New Brunswick, Prince Edward Island and the Magdalen Islands. In the statement of local ranges there is evidence that the author has made a canvass of some of the more inclusive herbaria where plants of his region have been assembled, though, from the occasional omission of species enumerated by Macoun as found by him within the province, one wonders if the National Herbarium at Ottawa was checked. Often the old identifications under which plants have been recorded are shown to need correction, a valuable phase of such a work. There is an evident attempt to keep up-to-date on nomenclature and the latest published revisions are often followed, with the result that this is one of the most up-to-date local floras of eastern America. Whether some recent revisions are of equal value with more careful predecessors may, however, be questioned. For instance, the present reviewer can not maintain as a good species the recently described *Suaeda Fernaldii;* this evaluation paralleling Dr. Roland's own decision that the still more recently described *Aster Rolandii* is not worthy recognition!

When a piece of work which has obviously been done with care comes out it may seem to some inappropriate to note points which, in another edition of the book, might be improved. This the present writer does in all friendliness, especially since the greater share of his field-work has been prosecuted in eastern Canada or Newfoundland. In some cases localized species or varieties are taken into the new book and given regular numbers as if they are part of the provincial flora, although in the discussion the author states that they are to be watched for, not that they there occur. To this group belong one of the

[1] Rhodora 46: 143, 1944.

[2] A. E. Roland. *The Flora of Nova Scotia.* Reprinted from Proc. N. S. Inst. Sci. xxi, pt. 3 (1947). Repr. 1948. 552 pp., 127 figs. (each of more than one species) and 477 maps. Truro Printing and Publishing Co., Truro, Nova Scotia.

varieties (by some considered a species) of *Ruppia maritima* "found on the Magdalens and on P. E. I., but not yet in N. S."; *Carex sterilis*, unknown in eastern Canada from south of calcareous marshes of the Magdalens; and *Atriplex sabulosa* Rouy (*A. maritima* E. Haller, not Crantz), a remarkable species, isolated from the region of the Baltic and the North Sea, as are *Polygonum oxyspermum* Meyer & Bunge, which, before the identity was recognized, was supposed to be endemic to the Bras d'Or Lakes (as *P. acadiense* Fern.), and as are *Polygonum Raii* Babington and several other species. The strikingly disjunct range of *Atriplex sabulosa*, known with us only from the coastal sands of the Magdalen Islands, Prince Edward Island and northeastern New Brunswick, was discussed at length and shown in maps on pp. 1503 and 1504 of Proc. Internat. Congr. Pl. Sci. ii (1929). Another case, a little different (because the species is of broad and continuous range), is *Galium labradoricum* "apparently overlooked". This species delights in mediacid to calcareous soils in moss under arbor-vitae and larch and in such habitats in Gaspé and northern Maine it is difficult to overlook because of its clear white inflorescences. So far as we yet know, its southern limit in the Maritime Provinces is on Prince Edward Island and in New Brunswick.

If such plants, actually unknown in Nova Scotia, are to be included, many scores of others which occur on Prince Edward Island or the Magdalens or in adjacent New Brunswick have the same claim as prospective Nova Scotians. A few wide-ranging species, like *Cryptogramma Stelleri*, *Carex vaginata* or *Pilea pumila*, are likely to be found there; but Prince Edward Island, the Magdalens or the recently unglaciated northeastern corner of New Brunswick support a surprising series of isolated "relict" plants or endemics remotely isolated from their closest allies, plants which give these areas floristic individuality. If such distinctive plants as *Potamogeton filiformis* var. *Macounii* Morong (western North America), *Ruppia maritima* var. *brevirostris* Agardh or *R. brachypus* J. Gay (Europe and North Africa), *Montia rivularis* K. C. Gmel. (se. Newfoundland and Europe); *Myriophyllum magdalenense* Fern. (endemic), *Pterospora andromedea* Nutt. (chiefly western American), *Aster laurentianus* Fern. (endemic representative of a western species) and *Bidens heterodoxa* Fern. & St. John (endemic, with vars. in southern Connecticut) and many others are not included as plants we hope sometime to find in Nova Scotia, then *Atriplex sabulosa* (*maritima*) and several others should be excluded[1]. Would it not be better in such cases to note them as desired "prospects", either in smaller type or in brackets? As between Prince Edward Island and Nova Scotia the "wires sometimes get crossed". Thus, *Pyrola asarifolia*, as the text correctly states, occurs from Cape Breton to Kings County, Nova Scotia; but *P. asarifolia*, var. *incarnata*, unknown in Nova Scotia, occurs in Kings County, Prince Edward Island (*Fernald, Long & St. John*, no. 7891).

[1] One is reminded of summers spent on Prince Edward Island, where it was impossible to get away from the current conviction among the untravelled and most conservative residents, that "the Island" is the Dominion of Canada, if not the British Empire; and of a similar local belief about Nova Scotia often met in older residents there. However, not all interesting plants of Prince Edward Island or the Magdalen Islands belong to Nova Scotia.

Yet the map indicates the latter as true *P. asarifolia*, and true *P. asarifolia* (Nova Scotian) as var. *incarnata!* Such things happen to us all.

Another point which may well be altered in a future issue is one which very few botanists seem to understand. This is the citation of so-called *sensu* names, *i. e.* names under which plants have erroneously passed. In the synonymy one too often finds citations like the following, under *Polygonum:* "P. **exertum** Small, including *P. ramosissimum* Michx." The plant of borders of saline marshes in Nova Scotia is *P. exsertum* (described in 1894); whereas *P. ramosissimum* Michx. (described in 1803) is a wholly different and nearly transcontinental species (s. Quebec to Washington and southward). What was obviously meant in the quotation was: *P. ramosissimum* sensu someone or local records, not Michx. As stated, this differentiation between wrongly applied and correctly applied names is too often not made clear. In fact, authors can not be too clear if they wish to avoid misinterpretation. In Rhodora, xv. 68–73 (1913), the present reviewer discussed at some length the several North American plants which have erroneously passed as the quite different European *Polygonum maritimum* but, unfortunately, he did not summarize the conclusions in concrete differentiating paragraphs or keys. The plant on the sands along the coast from Massachusetts southward is *P. glaucum* Nutt.; that on the coast of the Maritime Provinces the very different *P. Raii* Bab.; yet, possibly due to the obscurity of the article cited, the southern *P. glaucum* appears in the new Flora as "a variant of the European *P. maritimum* [which it is not] . . . found along the coast of eastern New Brunswick". The plant of eastern New Brunswick is *P. Raii.*

Happily the author of the new Flora has drawn together many recent records of species not ordinarily recognized as Nova Scotian. Unfortunately, among these is another stoloniferous *Hieracium, H. Auricula* L., which, unless promptly choked off, will add to our aggressive weed-population. In some cases he has found only one collection which can be cited, although others are known, their records perhaps lost in the fire which destroyed his original notes; and, quite understandably, in the going over of large herbaria some species have been missed. These will doubtless be added in a future issue. As a slight contribution toward such an appendix, the following, all (unless noted) before me in the Gray Herbarium, may be listed.

Luzula luzuloides (Lam.) Dandy & Wilmott. Forming mats in a lawn at Pictou, *Fernald & St. John*, no. 10,989. Sterile but with typical base and foliage. A weedy species from Europe, known westward into Ontario and in the northeastern states.

Smilacina stellata (L.) Desf., var. crassa Victorin. A strongly marked thick- and broad-leaved variety following the seacoast from southern Labrador to the lower St. Lawrence, south to Long Island Sound. Dry barren, Trinity Cove, St. Paul Island, *Perry & Roscoe*, no. 149; sand-dunes, West End, Sable Island, *St. John*, no. 1183; dry rocky headlands, Central Port Mouton, *Fernald et al.*, no. 2074 in part.

Rumex persicarioides L. Local in Queens County: moist cobble-beach near mouth of Broad River, *Fernald & Bissell*, no. 21,056; Central Port Mouton, *Fernald et al.*, no. 21,057. Dr. Roland says it "may occur along the North Shore of N. S.". It probably does, but the South Shore won the competition.

Cerastium arvense L., var. viscidulum Gremli. Edge of Granite Cliffs, Trinity Cove, St. Paul Island, *Perry & Roscoe*, no. 203. Only North American station known from east of North Dakota.

Amelanchier intermedia Spach. From Cape Breton to Yarmouth, common. Very many nos.

Rubus arenicola Blanchard. On railroad east of station, Granville, Annapolis Co., August 1, 1909, "very characteristic of this species", *Blanchard*, no. 730.

R. recurvicaulis Blanchard. Very common from St. Paul Island and Cape Breton to Digby, Yarmouth and Shelburne Counties; many numbers collected by Howe & Lang, Blanchard and their successors.

R. trifrons Blanchard. Common from Canso (coll. *Fowler*) to Digby and Yarmouth Counties.

R. trifrons var. pudens (Bailey) Fernald (*R. pudens* Bailey). Louisburg, 1898, *Macoun*, no. 19,072 (as *R. hispidus*); sphagnous swamp, North Sydney, 1901, *Howe & Lang*, no. 684 (as *R. hispidus*).

R. tardatus Blanchard. Common from Hants and Halifax Counties to Yarmouth and Shelburne Counties; many collections from Blanchard and others.

R. multiformis Blanchard. Very common from Kings and Queens Counties westward; many collections by Blanchard and others.

R. vermontanus Blanchard. Common from Annapolis and Digby Counties to Shelburne County.

R. univocus Bailey. Dryish thickets, Sand Beach, Yarmouth Co., *Fernald & Long*, no. 21,544 (as *R. vermontanus*).

R. amicalis Blanchard. Several collections by Blanchard from Kings County to Yarmouth County.

R. alumnus Bailey. Annapolis, June 24, 1924, *J. G. Jack*, no. 3335.

R. glandicaulis Blanchard. Several collections by Blanchard and others from Hants, Annapolis and Shelburne Counties.

Trifolium pratense L. (typical). See Rhodora, xlv. 331 (1943). Scattered collections from St. Paul Island to Yarmouth County, mostly from waste places or neglected fields.

The larger cultivated plant is var. sativum (Mill.) Schreb.

T. hybridum L., var. elegans (Savi) Boiss. See Rhodora, l. c. Weed, Sable Island, *St. John*, no. 1264; roadsides and borders of fields, Yarmouth, *Bissell, Pease, Long & Linder*, no. 21,693.

Melilotus indica (L.) All. Ballast-heaps, Pictou, July 24, 1883, Macoun, no 65, cited by Macoun (Cat.) as *M. parviflora* Desf.

Epilobium Hornemanni Reichenb. Big Intervale, Cape Breton, July 14, 1898, *Macoun*, no. 19,137.

Fraxinus excelsior L. Escaped to roadsides, railroad-embankments, etc., Pictou, *Fernald & St. John*, no. 11,160; waste ground, railroad-ballast and roadsides, Dartmouth, *Fernald, Bartram, Long & St. John*, no. 24,347; naturalized, Lahave River, Bridgewater, *J. G. Jack*, no. 3518.

Mentha gentilis L. Border of cultivated field, Harper Lake, Shelburne County, *Fernald & Long*, no. 24,431.

Linaria dalmatica (L.) Mill. Fields and roadsides, South Ingonish, *Edith Scamman*, no. 4430.

Digitalis purpurea L. Grassy roadside, Baddeck, *Fernald & Long*, no. 22,431. Macoun, Cat. 360, says "Apparently *naturalized*" on Cape Breton. It is too much so in southwestern Newfoundland.

PLANTAGO MAJOR L., var. SCOPULORUM Fries & Broberg (*P. halophila* Bicknell). See Pilger in Engler, Pflanzenr. iv[269]. 51 and 52, fig. 8 (1937).—A very distinct maritime plant, so distinct as to have been three times separated as a species. Beach, Ingonish, August 5, 1904, *J. R. Churchill;* gravelly shore, Canso, *Rousseau*, no. 35,458; brackish rocky shore of Eel Lake, Belleville, *Fernald & Long*, no. 24,510.

SOLIDAGO TENUIFOLIA Pursh. Perfectly characteristic *S. tenuifolia* from gravelly beach of Feindel's Lake, west of Bridgewater, *Fernald & Long*, no. 24,608; boggy margin of Wile's (Oakhill) Lake, Lunenburg Co., no. 24,609; Harper's Lake, Shelburne County, no. 24,604; Mistake Lake, Digby Co., no. 24,605. Numerous collections from Yarmouth County, making clear transitions to var. *pycnocephala* Fern. = *S. galetorum* (Greene) Friesner (not simply Greene, who published it as *Euthamia galetorum*). Similar transitions are quite apparent on eastern Cape Cod.

GNAPHALIUM MACOUNII Greene (*G. decurrens* Ives, not L.). Since only a single specimen from Windsor is cited, with "no other collection . . . known for the province", it is worth noting two made in 1921: dry clearings, North Mt., Granville, Annapolis County, *Bartram & Long*, no. 24,674; dry clearings and burns near Five-River (Morris) Lake, Shelburne County, *Fernald & Long*, no. 24,675.

ACHILLEA LANULOSA Nutt., a native American species, differs in several characters from the introduced *A. Millefolium* L. In the latter the stems are 3–10 dm. high, either arachnoid or glabrescent. Its corymbs are *flattish-topped* and 0.6–3 dm. broad; its ligules short-oblong. *A. lanulosa* is mostly lower (up to 6 dm. high), densely woolly, the relatively few leaves silky-lanate; the *round-topped or convex corymbs* only 2–10 cm. broad; the ligules narrow and short. It is transcontinental, following south along the coast or in open ground to southern New England. Clearing, St. Paul Island, *Perry & Roscoe*, no. 404; sand-dunes, Sable Island, *St. John*, no. 1346; roadside in dry soil, Windsor Junction, *Howe & Lang*, no. 434; low sand-dunes, Central Port Mouton, *Graves, Long & Linder*, no. 22,884; sand-hills, Villagedale, *Fernald, Long & Linder*, no. 22,883.

This brief enumeration of additions to the recorded flora indicates that there is plenty yet to do for the alert field-botanist. If species quite clear to those who have long known their diagnostic characters, *Scirpus acutus* and *S. validus*, for example, were included, the new list would be longer. If the collections made by John Macoun and often recorded by him were checked a considerable addition both of species and localities would follow. On page 169 of the Ottawa Naturalist, xiii. (1899) the late J. M. Macoun recorded his father's two localities for *Carex Crawei* Dewey on Cape Breton, a species with which John Macoun was perfectly familiar. A citation on the same page of *Scirpus rufus* from Cape Breton (*Macoun* in 1898) would give the earliest record for the province. All of which sums up to the conclusion that there is still much to be done in carefully checking old collections. There is more to do in making new discoveries. The present writer and his companions thought it a poor day if they did not bring in two to several species new to the province; Mr. Weatherby, venturing into slightly different areas, has made extraordinary additions and other plants are waiting discovery. The new and very useful Flora should stimulate new exploration. The reviewer regrets that he can not join in it.—M. L. F.

The Name Taraxacum Officinale.—In Castanea, xii. 61, 62 (1947) Dr. F. R. Fosberg, citing my taking up of the name *Taraxacum officinale* Weber, concludes: "Why he uses the later *Taraxacum officinale* rather than *T. vulgare* is not clear". Since others have asked the same question, a word of explanation may help them: the name *T. vulgare* (Lam.) Schrank (1792), based on *Leontodon vulgaris* Lam. Fl. Fr. ii. 113 (1778), is illegitimate under the International Rules. Lamarck's name was a substitute for *Leontodon Taraxacum* L.:

"Pissenlit commun. *Leontodon vulgare*.

Leontodon taraxacum Lin. Sp. 1122."

As said, by the International Rules such mere substitute-names are ruled out and cannot be taken up under another generic name if, at the date of transfer, there already existed a legitimate epithet of its own rank. When the combination *Taraxacum vulgare* (Lam.) Schrank (1792) was published there already existed the legitimate name *Taraxacum officinale* Weber (1780). Therefore, *T. officinale* is the correct name, unless someone turns up one which is earlier. Since this working of an important rule is not understood by many botanists this brief statement may be clarifying.—M. L. Fernald.

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ORIGANUM FLEXUOSUM Walt. = PYCNANTHEMUM FLEXUOSUM (Walt.) BSP., as to basonym only = *P. hyssopifolium* Benth., both figs. from Walter's TYPE: FIG. 1, TYPE, × ⅖; FIG. 2, inflorescence, × 3.

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STUDIES OF AMERICAN TYPES IN BRITISH HERBARIA

M. L. Fernald and Bernice G. Schubert

(*Continued from page 208*)

Sium suave Walt. Fl. Carol. 115 (1788).—In Rhodora, xlv. 454 (1943) the senior author, recording the extension northward into southeastern Virginia of *S. floridanum* Small, Man. Se. Fl. 976, 1506 (1933), suggested that the type of Walter's species could have been a specimen of the latter species. Fortunately, however, the fragment preserved in the Walter collection is from perfectly characteristic material of the wide-ranging northern, as well as southern, plant, with stiffly ascending and strongly corrugated stems, relatively coarse rays of the umbel and very numerous flowers in the umbellets, of the plant now generally known as *S. suave*.

A synonym of *S. floridanum* is *S. lineare* Michx., β. *intermedium* Torr. & Gray, Fl. i. 611 (1840). One of Chapman's original specimens in the Gray Herbarium is definitely of *S. floridanum*. Should the latter eventually be placed under *S. suave* as an extreme variation, Torrey & Gray's varietal name will have to be considered.

Angelica lobata Walt. Fl. Carol. 115 (1788).—The type, a badly crumpled leaf is, without doubt, from a plant of *Ligusticum canadense* (L.) Britt., as already suggested by Mathias & Constance in N. Am. Fl. 28b. 145 (1944), a characteristic woodland species of the southeastern states.

LEUCOTHOE **editorum,** nom. nov. *L. Catesbaei* sensu Gray, Man. ed. 2, 252 (1856), not *Andromeda Catesbaei* Walt. Fl. Carol. 137 (1788), basonym.

In RHODORA, xlvii. 169–171 (1945), the senior author pointed out the utter confusion which has existed as to the true basis of *Leucothoe Catesbaei*, through the fact that Walter's type had not been clearly understood and that Pursh in describing *Andromeda spinulosa* had well defined the montane species but had given the locality as "Lower Carolina" and had cited *A. Catesbaei* Walt. as an exact synonym.

The Walter type (572), clearly labeled *Andromeda Catesbaei*, proves to be a flowering branch of very characteristic *Leucothoe axillaris* (Lam.) D. Don or *Andromeda axillaris* Lam. Encycl. i. 157 (1783). In the Synoptical Flora of North America, ii[1]. 34 (1878), Gray treated the montane species with caudate-attenuate leaf-tips and acutish bracts and sepals as *L. Catesbaei*, with the synonym *A. spinulosa* Pursh "excl. habitat"; and he added the parenthetical note, "Pursh characterized the two species but transposed the habitats", Pursh having cited the coastwise *Andromeda axillaris* as "on the mountains" and, as already noted, his *A. spinulosa* from the low country. Since *Andromeda spinulosa* Pursh had the exact synonym *A. Catesbaei* Walt., it must be treated as having an illegitimate name because Pursh should have used the earlier name which he cited. Other names which have been assigned to the synonymy of the montane shrub, *Leucothoe editorum*, are *Andromeda Walteri* Willd. Enum. 453 (1809), a renaming of *A. Catesbaei* Walt., and *A. lanceolata* Desf. Cat. Pl. Hort. Paris, 136 and 398 (1829), an unencumbered name but unfortunately antedated by *A. lanceolata* Wallich (1820) and *A. lanceolata* Vell. (1825). There seems, therefore, to be no binomial except possibly the later homonym, *Andromeda lanceolata* Desf., available which can legitimately be taken up for the plant which has erroneously passed as *L. Catesbaei*.

It is important to record the fact that it was clearly stated in his manuscript notes of 1887 by Asa Gray of "'Andromeda Catesbaei 572'. It is A. axillaris!" Apparently Gray found no opportunity to make the correction.

ASCLEPIAS POLYSTACHIA Walt. Fl. Carol. 107 (1788) was well described:

polystachia 13. fol. petiolatis oppositis lanceolatis laevibus, subtus venosis umbellis pluribus terminalibus lateralibusque, petalis et auriculis corniculatis purpurascenti-rubris, corpusculo latere fusco, apice albo; caulis 4-pedalibus.

This description, with "fol. petiolatis . . . lanceolatis laevibus, . . . umbellis . . . terminalibus lateralibusque", is so little suggestive of *A. rubra* L. which has, to quote Gray (Syn. Fl.), "leaves . . . tapering from near the rounded or obscurely cordate base to an acuminate apex", that it is surprising that Gray, Syn. Fl. ii[1]. 90 (1878), should have suggested the identity of *A. polystachia* (although with a saving "?") with *A. rubra*. He also suggested, likewise with a query, the identity of *A. cordata* Walt., l. c. 105, with *A. rubra*. There is no preserved specimen of the latter but Walter's "fol. cordato-lanceolatis subsessilibus" and his other characters pretty definitely indicate that his *A. cordata* is *A. rubra* L. (1753).

Walter's account of his *A. polystachia* is very similar to Gray's (Syn. Fl.) description of the leaves of *A. phytolaccoides* Pursh and Small's (Man.) account of the same species, as the earlier *A. exaltata* "(L.) Muhl.", that one automatically looks for a Walter specimen to match these accounts. Gray has "Bright green and glabrous: stem 4 or 5 feet high: leaves membranaceous, from oval to ovate-lanceolate, acuminate at both ends, short-petioled, 4 to 8 inches long" (compare "fol. petiolatis . . . lanceolatis laevibus"—*Walt.*). Small, describing the flowers of the same species, which extends southward to Georgia and Mississippi, says: "corolla-lobes greenish or greenish-purple . . . : hoods . . . white or flushed with pink" (compare "petalis et auriculis corniculatis purpurascenti-rubris, corpusculo latere fusco, apice albo"—*Walt.*). Fortunately, on p. 10 of the Fraser volume there is a comparatively good foliage-specimen of "Asclepias Novum" with the ovate-lanceolate leaves acuminate to both ends, petioled and with the venation of the leaves of characteristic *A. exaltata* or *phytolaccoides*.

From the bibliography given by Britton & Brown, iii. 9 (1898),

A. Syriaca var. *exaltata* L. Sp. Pl. Ed. 2, 313. 1762.
Asclepias exaltata Muhl. Cat. 28. 1813.
A. phytolaccoides Pursh, Fl. Am. Sept. 180. 1814,

one might infer that Walter's binomial of 1788 should be taken

up, but Muhlenberg happened, although citing no basonym nor giving any diagnosis, to hit on the correct binomial; for in Species Plantarum, ed. 2, l. c., Linnaeus cited under his *A. syriaca*, β. *exaltata* an earlier reference. Following this back we find the *species*, properly with a binomial and a very detailed description, as A. EXALTATA L. in Amoen. Acad. iii. 404 (1756). That is the correct binomial.

ORIGANUM FLEXUOSUM Walt. Fl. Carol. 165 (1788), our PLATE 1112, was one of two new species described by him under a genus defined "*Involucrum* multisetum verticillo subjectum" etc.; *i. e.* his *Origanum* was primarily the species of *Pycnanthemum*, § *Tullia* Benth., with bristle-tipped calyx-teeth. Walter's description was

flexuosum 2. An satureja virginiana? LINN. capitulis axillaribus, floribus sessilibus, bracteis quam corollulae minoribus, caule flexuoso, foliis sublinearibus.

This species is one of the two of the genus represented, without specific name, on p. 79 in the Fraser series. The specimen (our PLATE 1112, FIG. 1, × ⅖, FIG. 2, × 3) is an unusually good one of the characteristic plant of Walter's region with heads on axillary branches, calyx-lobes aristate, stem often flexuous and leaves "sublinear" (linear-oblong to narrowly oblong-lanceolate and blunt, entire or nearly so) which was described as *Pycnanthemum hyssopifolium* Benth. (1834), almost as if he had Walter's specimen before him: "foliis subsessilibus oblongo-lanceolatis linearibusve obtusis subintegerrimis . . . , verticillastris paucis multifloris laxiusculis, bracteis subulatis aristatis extimis oblongis, calycis dentibus subaequalibus subulatis rigidis". There is no question about the true identity of *Origanum flexuosum* Walt. with the consequent carelessly made combination, PYCNANTHEMUM FLEXUOSUM (Walt.) BSP., Prelim. Cat. N. Y. Pl. 42 (1888), the combination unintelligently published without bibliographic citation as P. "flexuosum, (Walt.) (*P. linifolium, Pursh.*)", unintelligently because the Walter description and plant are of a section very distinct from that containing Pursh's *P. linifolium!* In Mem. Torr. Bot. Cl. v. 279 (1894) Britton clarified the essential bibliography by basing *Koellia flexuosa* (Walt.) Britton on *Origanum flexuosum* Walt. Fl. Carol. 165 (1788), overlooking the

PINGUICULA CAERULEA Walt.: FIG. 3, TYPE, × ca. ⅓, mislabeled by Fraser as *Utricularia gibba;* FIG. 4, plant and flowers, × 1, from Summerville, South Carolina, *Hunnewell*, no. 8115.

P. LUTEA Walt.; FIG. 2, TYPE, × ½.

OXALIS VIOLACEA L.: FIG. 1, inflorescence, × ½, mislabeled by Fraser as *Pinguicula caerulea!*

fact that the combination *K. flexuosa* (Walt.) MacMillan, based on "*Nepeta* [instead of *Origanum*] *flexuosa* Walt.", without citation of page (presumably not seen by MacMillan), was published in Metasp. Minn. Val. 452 (1892), for a mixture of three species said to grow in Minnesota, at least 650 miles northwest of the western limit of Walter's species. Britton gave other synonyms, including *P. linifolium* Pursh (1814) and "*Satureia Thymus Virginicus* L. Mant. 2: 409 (1771)".

Before discussing the latter names it should be noted that Grant & Epling, *Study of Pycnanthemum*, Univ. Calif. Pub. Bot. xx. no. 3: 224 (1943), explicitly say, we know not why: "there are no specimens of this species [Walter's *Origanum flexuosum*] among the Walter plants in the British Museum; *P. aristatum* is represented, however". Since *P. aristatum* Michx. (i. e. *P. setosum* Nutt.—see Fernald in Rhodora, xlvii. 178 (1945)) has, as correctly described by Grant & Epling "leaf blades narrowly ovate, infrequently ovate-lanceolate, usually rather acute, . . . 1–3 cm. broad", it is difficult to understand how the Walter specimen could have been so misidentified; there is nothing preserved in the Fraser series but this one easily identifiable specimen and two unmatched fragments which have subulate-aristate calyx-lobes but very narrowly linear leaves. These fragments, which are surely not of the section *Brachystemum* Benth., which contains *P. linifolium*, definitely belong, like *P. setosum* and true *P. flexuosum* (*P. hyssopifolium*) to § *Tullia* and apparently represent an unrecognized species, which should be sought in eastern South Carolina.

In the synonymy of *Koellia flexuosa* sensu Britton, l. c., excluding basonym, there appears another name which was published earlier than *Brachystemum linifolium* Willd. Enum. 623 (1809), basonym of *Pycnanthemum linifolium* (Willd.) Pursh, Fl. Am. Sept. ii. 409 (1814). This was the already quoted "*Satureia Thymus Virginicus*" L. Mant. ii. 409 (1771) which leads us to the Linnaean account. This gives no justification for the trinomial listed by Britton, for here is what Linnaeus said:

> Satureja *virginic.* THYMUS capitulis terminalibus, caule erecto, foliis lanceolatis *rectius*.

Without further explanation it would seem that here was a variant of the old and much confused *S. virginiana* L. (1753),

which has been well established in the sense of *P. lanceolatum* Pursh (see Grant & Epling, l. c. 221). Grant & Epling cite under *Pycnanthemum flexuosum* in their sense the synonym *Koellia capitata* Moench, Meth. 408 (1794) which, obviously antedates *Brachystemum linifolium* Willd. (1809) and *Pycnanthemum linifolium* (Willd.) Pursh, but Moench, describing a plant "foliis lanceolatis", cited as an unquestioned synonym "*Thymus virginicus. Linn.*". Since he did not take up this earlier name Moench's name was illegitimate; its lanceolate leaves are not good for *P. linifolium.* Incidentally, Grant & Epling, with many collections before them could map the latter species (their map 11) from South Carolina only from the mountains, and assiduous collectors have not secured it from the Coastal Plain south of North Carolina. In other words it is not known from near Walter's home, where the plant Walter described and collected abounds (see Grant & Epling, map 13). With many stations recorded in eastern but none in western South Carolina and copious material from Walter's own county the identity of his species might have been surmised.

The upshot seems to be that, since the preserved specimen which exactly coincides with Walter's description of his *Origanum flexuosum,* is characteristic *Pycnanthemum hyssopifolium,* we are forced to a change:

PYCNANTHEMUM FLEXUOSUM (Walt.) BSP. Prelim. Cat. N. Y. Pl. 42 (1888), as amplified by Britton in Mem. Torr. Bot. Cl. v. 279 (1894) as to basonym, not sensu BSP. *Origanum flexuosum* Walt. Fl. Carol. 165 (1788). *P. hyssopifolium* Benth. Lab. Gen. Sp. 329 (1834). *P. aristatum* Michx., var. *hyssopifolium* (Benth.) Gray, Syn. Fl. N. Am. ii^1. 354 (1878). *Koellia flexuosa* (Walt.) MacMillan, Metasp. Minn. Val. 452 (1892) as to name only; sensu Britton in Mem. Torr. Bot. Cl. v. 279 (1894), not as to other synonyms.

We now reach the stiffly branched and tough (not "flexuous") plant, of Bentham's § *Brachystemum,* which has been erroneously passing as *Pycnanthemum flexuosum.* That it is *P. linifolium* (Willd.) Pursh, Fl. Am. Sept. ii. 409 (1814), based on *Brachystemum linifolium* Willd. Enum. Hort. Berol. 623 (1809), there is no doubt; but it is also *P. tenuifolium* Schrader, Hort. Gott. 10, tab. iv (1809). Schrader gave a very full analytical description of the plant (unfortunately said to have its "Habitat in Archi-

pelago") and a full-size colored plate of our common linear-leaved species which Willdenow defined the same year. But by present rules of nomenclature Willdenow's *Brachystemum linifolium* was an illegitimate name for, after a two-line diagnosis, Willdenow cited as exact synonyms the earlier *B. virginicum* Michx., which rested on *Thymus virginicus* L., and also *Thymus virginicus* of "Sp. pl. ed. W. 3. p. 145". Since the *Thymus virginicus* of Willdenow's Species was the *T. virginicus* L., Willdenow should have retained the original specific epithet. Thus, although published slightly later, *Pycnanthemum tenuifolium*, beautifully described and illustrated and without citation of an earlier name, is the legitimate name of the plant, the bibliography of which is

PYCNANTHEMUM TENUIFOLIUM Schrader, Hort. Gott. 10, t. iv (1809). *Satureja virginiana* L. Sp. Pl. ii. 567 (1753) in part only. *Thymus virginicus* L. Mant. ii. 409 (1771), in part only, renaming of the preceding. *Brachystemum virginicum* Michx. Fl. Bor. Am. ii. 6 (1803) as to plant only. *B. linifolium* Willd. Enum. 623 (1809) as to plant, name illegitimate. *P. linifolium* Pursh, Fl. Am. Sept. ii. 409 (1814). *P. flexuosum* sensu BSP. Prelim. Cat. N. Y. Pl. 42 (1888), as to plant, not as to basonym. *Koellia flexuosa* MacMillan, Metasp. Minn. Val. 452 (1892) in part only, not as to basonym; Britton in Mem. Torr. Bot. Cl. v. 279 (1894) as to plant, not as to basonym.[1]

COLLINSONIA SEROTINA Walt., Fl. Carol. 65 (1788), was well described "fol. magnis oppositis ovatis, petiolis longis, *supremo pari unice sessili, cordato;* panicula terminali ramosissima". Asa Gray, in the Synoptical Flora, ii[1]. 351 (1878), cited it without question as identical with *C. punctata* Ell., Sk. i.36 (1816), which he treated as *C. canadensis*, var. *punctata* (Ell.) Gray. The species is now often treated as distinct and in such cases Walter's name should have precedence over Elliott's. In the varietal category Elliott's epithet is applicable.

PINGUICULA CAERULEA Walt. Fl. Carol. 63 (1788), as represented in the Fraser series of Walter's plants, our PLATE 1113, FIG. 3, × ca. ⅓, well illustrates the almost absurd confusion made

[1] On sheets in the Gray Herbarium we find the following combination which should be published, as it indicates the correct status of the plant:

PYCNANTHEMUM TORREI Benth., var. **leptodon** (Gray) Boomhour, comb. nov. in Herb. Gray. *P. pilosum* Nutt., *β. leptodon* Gray in Am. Journ. Sci. xlii. 46 (1842). *P. leptodon* Gray, Syn. Fl. N. Am. ii[1]. 355 (1878).

by Fraser or the Frasers in attempting to identify the specimens or fragments. On page 83 of the series a small umbel, FIG. 1, mounted just above the properly identified *Pinguicula lutea* Walt. (FIG. 2), bears Fraser's label "*Pinguicula caerulea*". Asa Gray, as shown in his manuscript notes, recognized that this fragment is an inflorescence of *Oxalis violacea*. However, on another page (no. 526 on p. 80), there is a different specimen, correctly called *O. violacea*, this one with bulb and leaves, as well as umbel. Finally, specimen no. 487 on p. 104, bearing the appended name "*Utricularia gibba*", solves the mystery, for this is a plant of *Pinguicula* (our FIG. 3, × ca. ⅓) with dark and opaque rosette-leaves and a characteristic flower, which is readily matched (as to profile) by such a representative sheet of *P. elatior* Michx. (1803) as that of *F. W. Hunnewell*, no. 8115 (FIG. 4), from Summerville, South Carolina. The decision by Barnhart in Addisonia, xviii. 21, t. 587 (1933), to take up P. CAERULEA Walt. (1788) instead of *P. elatior* Michx. (1803) seems quite justified. In fact, when he published *P. elatior* Michaux himself suggested that it might be Walter's *P. caerulea*.

DIANTHERA OVATA Walt. Fl. Carol. 63 (1788) was well described but there seems to be no specimen preserved. It was transferred in 1900 to *Justicia* as *J. ovata* (Walt.) Lindau in Urban, Symb. Antill. ii. 237 (1900). In RHODORA, xliii. 641 (1941) the senior author took up for it the later *J. humilis* Michx. (1803) because *J. ovata* Dietrich in Steudel, Nom. ed. 2, i. 838 (1840) seemed to invalidate Lindau's combination. Unfortunately, however, as we are now beginning to understand, many names newly published by Steudel are illegitimate and have no nomenclatural force because they were published as synonyms only. Examination of the name *J. ovata* Dietr. clearly shows that it was a mere synonym. On p. 838 of Steudel it appeared in italics (as a synonym) under *Justicia* as "*ovata. Dietr.* Dicliptera peruviana" and on p. 504, under the maintained *Dicliptera* (with *Justicia* as a generic synonym) D. "peruviana. Juss." had the synonym *Justicia ovata* Dietr. Index Kewensis also lists *J. ovata* E. Meyer in Drège, Zwei Pfl. Docum. (Flora, xxvi². Beig.) 196 (1843), from South Africa. There again the name had no nomenclatural force for it was a *nomen nudum*. In enumerating the plants of different localities Drège listed on p. 149, his no.

Eupatorium pilosum Walt. — *E. verbenaefolium* Michx. and *E. teucrifolium* Willd., all figs. from Walter's type: fig. 1, type, × $^{2}_{5}$; fig. 2, upper leaf, × 2; fig. 3, portion of inflorescence, × 2.

4818 as "Justicia ovata, 4818". Then on p. 196, in an alphabetical list of his South African plants, he gave *Justicia* "ovata E.M.)". That seems to be the full publication of *J. ovata* E. Meyer. Later authors have regularly cited it in the synonymy of the species with which the Drège material has been identified but they do not seem to have defined it as *J. ovata*. Thus, Presl, Bot. Bemerk. 95 (1844), without a word of definition, said "Justicia ovata E. Meyer in Drege—est Dicliptera ovata Presl". In his treatment of the *Acanthaceae* in DC. Prodr. xi. 336 (1847) Nees ab Esenbeck described in detail the Drège material as *Rhytiglossa ovata*, with the synonym "Justicia ovata E. Meyer! cat. pl. Drèg." but the latter name can hardly be said to have been defined, except as a synonym. Similarly, C. B. Clarke in Thiselton-Dyer, Fl. Capensis, v[1]. 80, 81 (1901) takes up *Isoglossa* "**ovata** (Lindau in Engl. & Prantl, Pflanzenfam. iv. 3B, 344)", giving a full description of the South African plant with the synonym "*Justicia ovata, E. Meyer in* Drège" etc. cited, as if that name had been defined. Just to show how hit-or-miss is the bibliographic work of too many of us (and we all get caught unless we scrupulously verify citations) we may turn to Clarke's reference (correct it would seem) to *Isoglossa ovata* Lindau in Engler & Prantl. Turning to the reference we find under *Isoglossa* "*I. ovata* (Nees) Örst." along with many other binomials referred to Örsted; but, unhappily, Örsted in publishing the genus *Isoglossa* in Kjoeb. Vidensk. Meddel. for 1854: 155 (1855) made no combinations, merely saying, after his definition of the genus "Rhytiglossa ciliata et ceterae species capenses huc pertinent". According to *Index Kewensis* this constituted the publication of *I. ciliata*, but, even admitting that it does do so (by the International Rules), Örsted certainly did not there publish *I. ovata*. The primary author of the trivial name *ovata* for the South African plant seems to be Nees. It surely can not be taken up as based on the undescribed *Justicia ovata* Dietr. with which this complicated digression began. But the combination JUSTICIA OVATA (Walt.) Lindau should stand for the North American plant which was later defined as *J. humilis* Michx.

EUPATORIUM PILOSUM Walt. Fl. Carol. 199 (1788) (our PLATE 1114, FIG. 1, × ⅖; FIGS. 2 and 3, × 2), described: "foliis lanceolato-ovatis, basi obtusis, serratis sessilibus, calycibus pilosis",

has very generally been thought possibly to be the same as *E. verbenaefolium* Michx. (1803), which antedates the identical *E. teucrifolium* Willd. (1804). Thus Gray, Syn. Fl. N. A. i². 99 (1884), taking up *E. teucrifolium*, gave as its first synonym "*E. pilosum*, Walt. Car. 199?". This interrogated identity is given in Index Kewensis, doubtless following Gray, and Britton & Brown give it (also with the interrogation) under *E. verbenaefolium*. Walter's description obviously applies to this common species of his region, in which the leaves of the primary axis are rounded to sessile bases, the reduced upper ones either sessile or with very short petioles. On the three pages of Fraser's series of Walter plants only one individual agrees with Walter's diagnosis. That, no. 755 (on p. 45), is a very characteristic inflorescence, with the lance-ovate, serrate and roundish-based leaves (although very short-petioled) of thoroughly typical *E. verbenaefolium*, the type of the latter and a pilose involucre ("calycibus pilosis") shown in RHODORA xlvii. t. 910 (1945). The Walter specimen could well have been the pattern for the inflorescence of *E. verbenaefolium* shown in Britton & Brown, Ill. Fl. iii. fig. 3624, p. 310 (1898). There seems no valid reason further to doubt that EUPATORIUM PILOSUM Walt. (1788) is the earliest and correct name for *E. verbenaefolium* Michx. (1803) or *E. teucrifolium* Willd. (1804).

EUPATORIUM LINEARIFOLIUM Walt. Fl. Carol. 199 (1788). It has generally been inferred, without examination of Walter's material, that *E. linearifolium* is the extreme and wide-ranging variety of *E. hyssopifolium* L. with very narrowly linear or linear-oblanceolate leaves only 0.5–5 mm. broad, these opposite or most often in whorls of 4 or 6 and subtending very dense suppressed axillary branchlets of fascicled shorter leaves. Following this common interpretation the senior author named and illustrated this commonest variety of *E. hyssopifolium* as var. *linearifolium* (Walt.) Fernald in RHODORA, xliv. 460, pl. 737, fig. 3 (1942). Most surprisingly, however, there is nothing of this sort in the Fraser series of Walter's plants. The only one of Walter's preserved specimens which matches his description of *E. linearifolium*, "foliis linearibus integris subverticillatis, calycibus 3 ad 5-floris", is no. 671 on page 44. This specimen, with few-leaved axillary fascicles, is a good match for *E. tortifolium* Chapm. in

Bot. Gaz. iii. 5 (1878), with "leaves vertical, lanceolate, entire, . . . , the upper ones linear, alternate; . . . heads . . . 5-flowered; . . . Leaves 1–1½ in. long", Walter's "foliis linearibus . . . subverticillatis" evidently referring to the false whorls produced by the suppressed axillary branches of few leaves which regularly occur in *E. tortifolium*, as shown by isotypic material from Chapman and Ravenel's material from Santee Canal, the home of Thomas Walter. It is evident that the name *E. tortifolium* Chapm. (1878) must give way to E. LINEARIFOLIUM Walt. (1788).

The plant which has erroneously passed as *Eupatorium linearifolium* is

E. HYSSOPIFOLIUM L., var. **calcaratum,** nom. nov., foliis anguste linearibus vel lineari-oblanceolatis integris 0.5–5 mm. latis, laminis primariis 3–6 cm. longis oppositis vel verticillatis verticillis 4–6 foliis, fasciculo axillari densissime breviori.—Var. *linearifolium* sensu Fernald in RHODORA, xliv. 459, 460, pl. 737, fig. 3 (1942), not *E. linearifolium* Walt., basonym. TYPE from dry sands back of beach near Bass River Light, Dennis, Massachusetts, September 2, 1918, *Fernald & Long*, no. 17,448 in Herb. Gray.; isotype in Herb. Phil. Acad.

All others of Walter's new species of *Eupatorium*, in so far as specimens are preserved, seem to have been correctly interpreted. His *E. fusco-rubrum*, no. 733 on p. 46 of the collection, is small *E. purpureum* L. His *E. Marrubium* seems to be missing. *E. foeniculoides* (on p. 45) is represented by a large panicle of *E. capillifolium* (Lam.) Small, based on *Artemisia capillifolia* Lam. (1783); while *E. compositum* (on p. 46) is represented by a characteristic inflorescence. *E. cordatum* seems to be missing but a specimen of *E. incarnatum* is at the lower right hand corner of p. 46. No. 24 on page 44, marked simply "Eupatorium" is *Kuhnia eupatorioides* L. (1762). Another specimen, marked simply *Eupatorium* (at the right on p. 45), is a characteristic summit of *E. serotinum* Michx. (1803); this can not be reconciled with any species defined by Walter.

CHRYSANTHEMUM CAROLINIANUM Walt. Fl. Carol. 204 (1788). The specimen (684) in the Walter Herbarium is an exceptionally good one, the summit of a large flowering plant. It is, happily, what it was supposed to be when it was transferred to *Boltonia* as *B. caroliniana* (Walt.) Fern. in RHODORA, xlii. 487, pl. 642 (1940).

The plant from which the latter plate was made very closely matches Walter's specimen.

CARDUUS SPINOSISSIMUS Walt. Fl. Carol. 194 (1788), our PLATE 1115, FIG. 1, × 2/5, has generally been interpreted as identical with *Cirsium horridulum* Michx. Fl. Bor.-Am. ii. 90 (1803). This identification of the two may have started with Darlington, Fl. Cestr. ed. 2: 438 (1837), Darlington reducing *Cirsium horridulum* to *Carduus* "SPINOSISSIMUS, Walt.?" but giving a detailed description of the former. Even when, in RHODORA, xiii. 239, 240 (1911), Robinson pointed out that the combination *Cirsium spinosissimum* "(Walt.) Scop." was a sad confusion, since Scopoli's combination was really based on the European *Cnicus spinosissimus* L., he made no suggestion that Walter's plant is not *Cirsium horridulum*. The TYPE of Walter's *Carduus spinosissimus* is a whole plant, even includiing the base, but it is not *Cirsium horridulum*. Instead, it is a very characteristic, small specimen of *Cirsium Smallii* Britton in Britt. & Millsp. Baham. Fl. 458 (1920), a renaming of *Cirsium pinetorum* Small, Fl. Miami, 199, 200 (1913), not Greenm. (1905), Small having originally called it *Carduus pinetorum* Small, Fl. Se. U. S. 1308, 1341 (1903). Walter's plant is not only a good match for Florida material sent out by Small; it is almost identical with material collected from "flat pineland" by Ravenel close to Walter's home, in Santee Canal, South Carolina. Owing to the European *Cirsium spinosissimum* (L.) Scop. the name C. SMALLII has right-of-way.

Walter had two other species of *Carduus* and, from the character of the tiny snips which he gave to Fraser, Asa Gray was justified in his manuscript note of February 9, 1839, in writing merely "Carduus = 3 thistles!". He was then unfamiliar, of course, with *Cirsium Smallii*, which was first recognized in 1903, and the two fragments mounted beside that superior specimen were of species then unfamiliar to him. *Carduus virginianus* L. was clearly described by Walter "foliis lanceolatis spinulosis" etc. and he obviously had that species. His third species was

Carduus

carolinianus 2. foliis amplexicaulibus, hastato-pinnatifidis, spinis inaequalibus ciliatis, subtus tomentosis, calycibus aphyllis, squamis spinulosis, floribus paucis rubris.

Carduus spinosissimus Walt.: fig. 1, type, × ⅖ = Cirsium Smallii Britton, not *Cirsium spinosissimum* (L.) Scop.

Carduus carolinianus Walt. = Cirsium carolinianum (Walt.) Fernald & Schubert = *Carduus flaccidus* Small and *Cirsium flaccidum* (Small) Petrak: fig. 2, Walter's type, × ⅖; figs. 3 and 4, portions of a recent specimen from Houston, Texas, *E. Hall*, no. 371, × 1.

LISTERA BANKSIANA Lindl. = *L. caurina* Piper: FIG. 1, TYPE, × ⅖ of *L. banksiana* at right; specimens, × ⅖, from Banks Island, *Menzies*, at left.

L. CAURINA Piper: FIG. 2, inflorescence, × ⅗, from Wreck Bay, west coast of Vancouver Island, *W. R. Carter*, no. 843.

In Rhodora, xlv. 509, 510 (1943) the senior author, engaged at that time in a close study of eastern North American *Cirsium*, pointed out the many characters which distinguish *C. flaccidum* (Small) Petrak in Beiheft. Bot. Centralbl. xxxv. Ab. 2: 543 (1917), based on *Carduus flaccidus* Small, Fl. Se. U. S. 1307, 1341 (1903), and *Cirsium virginianum* (L.) Michx. Among the many characters then noted were the following: "In *C. virginianum* the peduncle-like flowering branches have several bracteiform leaves, in *C. flaccidum* the peduncles are naked or with only 1 or 2 bracts; in *C. virginianum* the involucre is 1.5–3 cm. high, in *C. flaccidum* only up to 2 cm. high". The small bit preserved by Fraser (no. 376 on p. 25) is merely a portion of an inflorescence (our PLATE 1115, FIG. 2, × ⅖) but it shows the naked leading peduncle of *C. flaccidum* and the involucre about 1.4 cm. high, a measurement below that shown in *C. virginianum* but duplicated or approximated by heads of many specimens of *C. flaccidum*. Fraser's fragment shows no well developed cauline leaves but numerous well collected specimens of *C. flaccidum*, such as Hall's material (our PLATE 1115, FIGS. 3 and 4) from slightly west of Small's type-region, in eastern Texas, well display the "foliis amplexicaulibus hastato-pinnatifidis spinis inaequalibus ciliatis" of *Carduus carolinianus*. They also show the naked leading peduncle as in the fragment preserved in the Fraser volume. It, therefore, seems that we should call the characteristic southern and inland species

CIRSIUM **carolinianum** (Walt.), comb. nov. *Carduus carolinianus* Walt. Fl. Carol. 195 (1788). *C. flaccidus* Small, Fl. Se. U. S. 1307, 1341 (1903). *Cirsium flaccidum* (Small) Petrak in Beiheft. Bot. Centrabl. xxxv. Ab. 2: 543 (1917); Fernald in Rhodora, xlv. 509 (1943). Our PLATE 1115, FIGS. 2 and 3.

PART V. A FEW SPECIES OF LATER AUTHORS

BETULA EXCELSA Ait. Hort. Kew. iii. 337 (1789) is, as shown by the very complete TYPE preserved, not an American, although thought by Aiton to be "Nat. of North America", and by various American and European students guessed to be *B. papyrifera* Marsh. There must have been other misconceptions regarding it, these reflected in the specific name and the English "Tall Birch Tree", for the fruiting type shows round-ovate leaves

hardly 3 cm. long and nearly as broad, while the excellent plate of the cultivated *B. excelsa* in Watson, Dendr. Brit. ii. t. 95 (1825) is obviously from a similar source, the tree described by Watson as 12–14 feet high ("70–80 in native country"), the leaves "subcordate-rotund, subincised-dentate", after which Watson gave the "Country . . . Province of Maine, Hudson's River". As what many botanists would delight to call him, a native "Mainiac", the senior author can vouch that nothing like it is known from Maine (nor from "Hudson's River"). Schneider, Ill. Handb. Laubholzk. i. 108 (1904), called it a hybrid of *B. pumila* L. and *B. papyrifera*, a not very convincing identification, while Rehder, Man. Cult. Trees and Shrubs, 142 (1927) said "perhaps a form of *B. pubescens* [European]", a reasonable guess.

FAGUS FERRUGINEA Ait. Hort. Kew. iii. 362 (1789) is characteristic *F. grandifolia* Ehrh., var. *caroliniana* (Loud.) Fern. & Rehd., forma *mollis* Fern. & Rehd. in RHODORA, ix. 114 (1907). Aiton's brief description, "foliis ovato-oblongis remote acute serratis acuminatis subtus tomentosis", indicates pubescence but not the leaf-base. His specimen shows the relatively broad leaves of the fruiting branch rounded to subcordate at base and the involucre with subdistant prickles. Those who consider this a separate species should note that *F. ferruginea* is, apparently, the earliest binomial for it.

CYPRIPEDIUM REGINAE Walt., forma **albolabium**, nom. nov. *C. spectabile* Salisb., β. *album* Sweet, Brit. Flower Garden, iii. t. 240A (1828); *C. Reginae album* Rolfe in Orchid Rev. v. 196 (1897) and xix. 208 (1911); *C. reginae*, forma *album* House in Bull. N. Y. State Mus., nos. 243–244: 37 (1923); not *C. album* Ait. Hort. Kew. iii. 303 (1789), basonym of all three combinations.

When Sweet described the plant with "labello extus albo" he called the one with "labello incarnato" *Cypripedium spectabile* α. *incarnatum*, and in the general synonymy of the two he cited *C. album* of Aiton. While it is possible to argue that Sweet did not mean that his β. *album* was truly *C. album* Ait., nomenclaturally, Aiton's name being there cited, must be considered the basonym. Sweet recognized that his α. *incarnatum* was the plant which had long been cultivated in England and he said of the "beautiful white variety": "We had never before seen or heard of a white variety". It is unfortunate, then, that he picked up

Aiton's misleading name. Rolfe, nearly 80 years later (1897), left no doubt when he wrote: "A most beautiful albino of Cypripedium Reginae, better known as C. spectabile, might recently be seen in the Orchid house at Kew, in which the rose-pink colour had vanished from the lip, leaving it as pure snow-white as the sepals and petals. . . The old specific name of C. album given by Aiton has been superseded by the still older C. Reginae, but can be most appropriately revived for the variety—C. Reginae album."

In describing *Cypripedium album* Aiton said nothing in his description about the lip or its color, although he called the plant "White Lady's Slipper" to contrast with yellow and purple *C. Calceolus* and with *C. acaule*, the latter "flore purpureo"; but he cited Plukenet's figure of the American plant "flore gemello [frequently so in *C. reginae*] candido venis purpureis striato". Since the plate in Bot. Mag. vi. t. 216 (1793), of the plant then being cultivated at Kew and elsewhere in England as *C. album* Ait., shows the roseate lip of ordinary *C. reginae*, we appealed for aid to Mr. Victor Summerhayes, Keeper of Orchids in the Herbarium at Kew. From his very illuminating letter of July 14, 1948 we quote:

> We have a copy of an uncommon book by a Miss Margaret Meen entitled "Exotic Plants from the Royal Gardens at Kew", consisting of two parts both published in 1790. This consists of a number of folio coloured plates and plate 3 of part i represents *Cypripedium album*. In this plate the sepals and petals are white but the lip is quite dark reddish with a paler interior.
>
> Taking this plate in conjunction with that in Botanical Magazine, t. 216 and Aiton's own citation of Plukenet's plant, there seems to me little doubt that the plant in general cultivation at that time, including Kew, had a pink or reddish lip and that the albino form, with pure white lip, was not grown until later. I quite agree with you that the name "album" cannot be applied to the white-lipped variety, at any rate not with Aiton's name associated with it.

Most singularly, the brief diagnosis of *Cypripedium reginae* Walt. Fl. Carol. 222 (1778) contains the phrases "caule multifloro, flore albo magno". The specimen in the Fraser series (on p. 39) has two flowers and the lip is obviously darker than the sepals and petals; *i. e.* it was the usual roseate-lipped plant.

LISTERA BANKSIANA Lindl. Gen. & Sp. Orchid. Pl. 455 (1840); our PLATE 1116. The original sheet of this species in herb.

Lindley at Kew, our FIG. 1, × 2/5, contains two collections from Banks Island (on the west coast of British Columbia), collected by Menzies, the material at the right being the TYPE, but with two much better specimens at the left, also from Banks Island, *Menzies*, which are identical. Below the latter specimen has been added "?California Mr Menzies" which is confusing and an assumption not well according with the location of the original Banks Island, an island nearly 50 miles long and lying between latitudes 53 and 54 degrees, opposite Graham Island of the Queen Charlotte group. The specimens are a very close match for *L. caurina* Piper in Erythea, vi. 32 (1898), our FIG. 2, × 3/5, and the latter name should lapse in favor of *L. banksiana* Lindl., based upon "*Ophrys banksiana* Menzies MSS.".

Wiegand, in Bull. Torr. Bot. Cl. xxvi. 157 et seq. (1899), somewhat further complicated matters by assuming that the Banks Island plant is *L. convallarioides* (Sw.) Torr., from which, however, it differs in many characters, most notable being the relative length of bracts and pedicels. Notes made at Kew, where *L. banksiana* was examined, indicate that the bracts were "much shorter than the pedicels". In *L. caurina* the bracts are described as "1/3 the length of the pedicel". In *L. convallarioides*, on the other hand, the bracts and pedicels are equal or with the bracts barely exceeding the pedicels and in *L. Eschscholziana* the pedicels are somewhat exceeded by the bracts. It would seem, therefore, that the identity is between the latter two species rather than that all four are identical. Wiegand believed that Piper's *L. caurina* does not occur in Alaska (to the north of Banks Island), stating that "there is no other species [except *L. convallarioides*] of this section found in Alaska". More recent collecting shows that *L. banksiana* (*L. caurina*) extends northward into southeastern Alaska, considerably to the north of Banks Island.

LISTERA ESCHSCHOLZIANA Cham. in Linnaea iii. 33 (1828); our PLATE 1117, × 1/2. There has been some question regarding the identity of this plant; Wiegand, l. c. 160, merely inferring from the description that it is *L. convallarioides* (Sw.) Torr.; while Ames, Enum. Orchids U. S. & Can. 75 (1924) made the note: "*Listera Eschscholoziana* Chamisso, which is questionably referred to *L. convallarioides* (Swartz) Nuttall [not a validly made

LISTERA ESCHSCHOLZIANA Chamisso = L. CONVALLARIOIDES (SW.) Torr.: FIG. 1, ISOTYPE of *L. Eschscholziana*, × ½, Chamisso in Herb. Gray.; FIGS. 2 and 3, two specimens, × ½, from Chamisso in Herb. J. Gay in the Lindley Herbarium (Kew).

combination by Nuttall], may be conspecific with *L. caurina* Piper". It is, consequently, worth noting that in the Gray Herbarium there are three plants of the original collection bearing Chamisso's own label. This collection, with the label, is shown in PLATE 1117, FIG. 1, the material also bearing Wiegand's identification as *L. convallarioides* and validation of the latter name by Hultén. Similar material from the herbarium of Jacques Gay is in the Lindley Herbarium at Kew, this marked by Gay "Chamisso misit Jan. 1829". These two specimens better displaying the broad lip are shown in FIG. 2.

TWO NEW NAMES IN POPULUS

ERNEST ROULEAU

A good geographical variety of *Populus balsamifera* L. is the tree that was known as *Populus balsamifera* var. *Michauxii* (Dode) Henry (*P. Tacamahacca* Mill. var. *Michauxii* (Dode) Farwell). It ranges from George River, Ungava, to the Thunder Bay District, Ontario, south to Newfoundland, Gaspé Peninsula, northern New England, northern New York and northern Michigan.

STOUT (Journ. N. Y. Bot. Gard. 30: 32. 1929) has claimed that *Populus candicans* Aiton represents the same variety and made the new combination *Populus Tacamahacca* var. *candicans* (Aiton) Stout in place of *P. Tacamahacca* var. *Michauxii;* the commonly cultivated Balm-of-Gilead being considered by him as a clone of this variety.

This variety is characterized by its cordate or subcordate leaves, very often strongly asymmetrical at the base, a little pubescent underneath along the veins, and by its slightly pubescent petioles.

If one goes back to DODE's description of *Populus Michauxi* (Bull. Soc. Hist. Nat. Autun, 18: 220, pl. 12, fig. 100. 1905; reprinted in Extr. Monogr. Inéd. Populus p. 62 et in Fedde, Rep. Spec. Nov. 3: 355. 1907), it is very surprising to find the following description:

> **100** F. tur. ovales-elliptiques, arrondies à la b., un peu en coeur à l'insertion du pétiole, acuminées; f. més.

sublancéolées, cunéiformes, un peu arrondies à la b., acuminées, subrhomboïdales; f. brach. elliptiques-deltoïdes, largement arrondies à la b., un peu en coeur à l'insertion du pétiole, aigües-acuminées; jeunes pétioles pubescents et jeunes feuilles ciliées, puis glabrescents; dents en scie peu profonde, peu apparentes; dessous des f. blanc, un peu roussâtre; turions un peu pubescents.....**Pop. Michauxi.**

= *P. balsamifera* Michaux f., *Hist. Arb. for. Am. sept.* 1813 (*non* Nouv. Duh., L. pro parte.)
Amérique du Nord. C**.

The only mention of cordate or subcordate leaf is in the "un peu en coeur à l'insertion du pétiole", both for the macroblasts and the brachyblasts; that is to say that the leaf is a little cordate at its junction with the petiole, although the general outline is oval-elliptic, rounded at the base. Moreover, DODE's figures do not represent any cordate or subcordate leaves. In addition, the synonym given by DODE (i. e. *Populus balsamifera* Michx. f., Hist. Arb. For. Am. Sept. 3: 306, 307, t. 13, fig. 1. 1813) is a good illustration of typical *Populus balsamifera* with ovate leaves. So, *Populus Michauxi* Dode must be reduced to the synonymy of *P. balsamifera* L.

It is then necessary to propose a new name for this plant as the name-bringing synonym does not represent the identity of the tree as understood by HENRY, FARWELL, SARGENT, REHDER and others. I propose to associate this variety with the name of Professor MERRITT LYNDON FERNALD who has very often collected this variety in Newfoundland, Gaspé and Maine.

POPULUS BALSAMIFERA L., var. **Fernaldiana,** nom. nov. *Populus balsamifera* var. *Michauxii* Henry, Gard. Chron., ser. 3, 59: 230. 1916 (as to plant involved only); *Populus balsamifera* var. *candicans* Gray, Man. Bot. N. U. S. (ed. 2) 419. 1856 (pro parte, as to plant involved only); *Populus Tacamahacca* var. *Michauxii* Farwell, RHODORA 21: 101. 1919 (as to plant involved only); *Populus Tacamahacca* var. *candicans* Stout, Journ. N. Y. Bot. Gard. 30: 32. 1929 (pro parte, as to plant involved only).

In order to verify STOUT's statement that the Balm-of-Gilead, i. e. *Populus candicans* Ait., was the same as *P. balsamifer-* var. *Fernaldiana*, or but a clone of it, I asked Dr. GEORGE TAYLOR of the British Museum for a photograph of the type-specimen of *Populus candicans* Aiton, which he very kindly sent to me. The

type-specimen of Aiton's species is but a macroblast of good straight *Populus balsamifera* so that Aiton's name has to be reduced to the synonymy of that species. Of course, the easiest way to identify this tree has been to match the leaves with those illustrated by Michaux f. who was the first to draw a figure of what he thought was the newly described *Populus candicans* Aiton without referring to the type-specimen.

There has been much discussion about the status of the Balm-of-Gilead, since it has been confused with *Populus balsamifera* var. *Fernaldiana*, has never been found in the wild state (though often freely escaping from cultivation and then, sterile) and that it is known only as a pistillate tree. I prefer to consider the Balm-of-Gilead as a hybrid, propagated from a single clone.

That the Balm-of-Gilead has a series of characters which makes it resemble *Populus balsamifera*, I admit. The under-surface of the leaves is rusty, the petioles are only slightly flattened, but these are the only characters that lead one into *Populus* § *Tacamahacca*. On the other hand, the crenate teeth of the leaves, the long petioles, the type of venation, the long-pedicelled female flowers and the cordate leaves tend to prove that there is some blood of § *Aegirus* in it.

The petioles covered with stiff fulvous hairs, the lower surface of the leaves also covered with hairs, seem to indicate that the other parent of this hybrid might have been *Populus deltoides* Marsh. var. *missouriensis* Henry. Young specimens of the last variety have the leaves and petioles with the same type of pubescence as in the hybrid. In the hybrid, this pubescence persists, whilst in *P. deltoides* var. *missouriensis*, it usually disappears but sometimes persists (*P. deltoides* var. *missouriensis* f. *pilosa* (Sarg.) Palmer & Steyermark). It is quite probable that this hybrid originated in North America and that it was later introduced into European gardens.

In order to prevent future confusion as to the application of the name of the Balm-of-Gilead (i. e. *Populus candicans* sensu Michx. f. et auct. plur., non Ait.), I propose a new name that will recall its popular name, i. e.

× Populus **gileadensis** stat. et nom. nov. (*balsamifera* × *deltoides* var. *missouriensis*). *Populus candicans* sensu Michx. f., Hist. Arb. For. Am. Sept. 3: 308, 309, t. 13, fig. 2. 1813 (as to

plant involved only, non Aiton, Hortus Kewensis 3: 406. 1789); *Populus balsamifera* var. *candicans* Gray, Man. Bot. N. U. S. (ed. 2) 419. 1856 (pro parte, as to plant involved only); *Aigeiros candicans* Nieuwl., Am. Midl. Nat. 3: 223. 1914 (as to plant involved only); *Populus Tacamahacca* var. *candicans* Stout, Journ. N. Y. Bot. Gard. 30: 32. 1929 (pro parte, as to plant involved only); *Populus Tacamahacca* sensu Moss, Cambr. Brit. Fl. 2: 13. 1914; sensu Schinz & Thellung, Viert. Naturf. Gesell. Zürich 60: 349. 1915; sensu Farwell, RHODORA 21: 101. 1919 (as to plant involved only), not Miller, Gard. Dict. (ed. 8), no. 6. 1768); *P. ontariensis* Desf. [Cat. Hort. Reg. Par. 1829] ex Loudon, Arbor. Frut. Brit. (ed. 1), 3: 1676. 1838 (in synonymy).

The name *Populus ontariensis* Desf. was never validly published and there is still doubt if it can be properly reduced to the synonymy of × *P. gileadensis*, since the specific epithet tends to show that the original tree seen by DESFONTAINES might have been an indigenous tree.

Dealing with the taxonomy and nomenclature of *Populus* is not an easy task. Before a satisfactory treatment of the species of the genus can be worked out, good specimens of flowers (male and female) collected at various stages, together with leaves (both of the macroblasts and the brachyblasts) collected from the same tree are very badly needed.

INSTITUT BOTANIQUE, UNIVERSITÉ DE MONTRÉAL.

NOTES ON THE FLORA OF ONTARIO.
I. EPIPACTIS HELLEBORINE

F. H. MONTGOMERY

It is almost sixty years since the introduced orchid, the Broad-leaved Epipactis, *E. Helleborine* (L.) Crantz, was reported occurring near Toronto, Ontario, by Messrs. Otto and Ward White[1]. This first Canadian record was in 1890, and since that time the observation of it has been considered interesting, but unworthy of serious comment.

During the past few years my interest in the plant has been increased by frequently seeing it in the field, and by the receipt of specimens for identification. An appeal to herbaria and many naturalists for specimens and information brought to me a num-

ber of herbarium sheets and reports, and from these, I have prepared the following map showing what is known of its present distribution.

The counties for which information is available by herbarium specimens, represented by black dots, and recorded observations, shown by clear circles, are as follows: 3, Elgin; 4, Norfolk; 6, Welland; 8, Wentworth; 12, Brant; 15, Waterloo; 16, Wellington; 17, Halton; 21, Simcoe; 22, Peel; 23, York; 24, Ontario; 25,

Durham; 26, Northumberland; 30, Leeds; 37, Carleton; 40, Peterborough; 49, Prince Edward (See map).

It is not expected that this should represent a complete picture of its distribution, for it is undoubtedly much more widely spread than present records show. The fact that it is common at the eastern, western and northern limits shown on the map would seem to verify this supposition. More extensive collecting will probably show it existing in all of the counties along Lake Ontario and the St. Lawrence River, and along the Ottawa River to the vicinity of Ottawa. It is possible that it is rarer in southwestern Ontario, since several competent observers and collectors have not reported it west of Waterloo County. Northward, it

is said to be very common around Lake Simcoe in Simcoe County, number 21 on the map.

The information also shows that the orchid is found most frequently in open deciduous woods, borders of woods, and on wooded hillsides, particularly along the river valleys. Occasionally it is found in open spaces such as meadows, lawns and gardens. *Epipactis*, like many other Old World introductions, is apparently finding its Ontario home very much to its liking, for it occurs commonly in most of the localities shown on the map, and in a few places becomes frequent enough to be classed as a weed.

During 1947, I received an interesting specimen collected at Cedar Springs, near Hamilton, by Miss Elizabeth Taylor of McMaster University. She describes the plant as having creamy colored leaves and pinkish flowers, instead of the usual green leaves and purple tinged, greenish flowers. Frère Marie Victorin describes apparently similar variations occurring in plants found in Quebec[2].

I wish to thank all who have assisted in this investigation, particularly Mr. Hubert H. Brown of Toronto, from whose herbarium much material was obtained, and Dr. F. A. Clarkson, also of Toronto, for much pertinent information.

ONTARIO AGRICULTURAL COLLEGE,
Guelph, Ontario.

(1) MACOUN, J. M., The Canadian Record of Science, 1894.
(2) MARIE-VICTORIN, FRÈRE, Flore Laurentienne, Imprimerie de la Salle, Montreal, 1935.

ERIGERON COMPOSITUS Pursh, var. DISCOIDEUS Gray, forma **trifidus** (Hook.), stat. nov. *E. trifidus* Hook. Fl. Bor.-Am. ii. 17, t. cxx (1834). *E. compositus*, var. *trifidus* (Hook.) Gray, Proc. Am. Acad. xvi. 90 (1880).

It is most unfortunate that the rules of nomenclature demand that, because of priority of publication, the name of a trivial and unusual form (var. *discoideus*) must be taken up to include a wide-ranging and locally abundant plant with showy ligules and that the latter has to be treated as a mere form of the almost aberrant state of the inclusive variety. In the Rocky Mountain area, in Arctic America and Greenland, as well as on the Gaspé

Peninsula, the abundant plant is, as noted, the ligulate-flowered one, while the discoid plants are very exceptional ones growing with them. In Brittonia, vi. 242–244 (1947) Cronquist treats plants with leaves "mostly 2–3 times ternate" as var. *glabratus* Macoun (1884), this most inadequately described merely as "Perfectly smooth"—inadequately because the latest monographer of the genus does not use the degree of pubescence or its absence as of importance in the species. By him plants with "Leaves mostly only once ternate" are called a different variety, var. *discoideus* Gray (1862), this variety including the basic *E. trifidus* Hook. and *E. pedatus* Nutt., *E. compositus* var. *trifidus* (Hook.) Gray, *E. Gormani* Greene and several later synonyms. In the Gray Herbarium Cronquist has annotated many specimens from Greenland and Gaspé as var. *discoideus*, although they show, especially among the newer leaves, plenty of twice ternate blades, and other eastern, as well as western, specimens with just such leaves are similarly annotated; while in eastern strongly pubescent plants, annotated by the monographer as var. *glabratus*, leaves variously cleft, from simply trifid to twice ternate, are readily seen. In fact, the type of var. *discoideus* (*Parry* no. 5) shows several twice ternate blades, while of the leaves of his *E. trifidus* Hooker wrote: "a few . . . being compound". Furthermore, Nuttall's description of the leaves of his *E. pedatus* read: "primary leaves simple or trifid, afterwards pedate, unequally five-cleft"; and Greene's account of his *E. Gormani* was "Earliest foliage merely 3-cleft or lobed . . . later leaves with the lateral lobes, and sometimes the terminal one, 3-lobed". In other words, the later and abundant leaves are often quite as much cleft as in the so-called var. *glabratus*.

In view of the magnification of the value of the degree of leaf-cutting and the complete neglect of the fact that most plants treated by Cronquist as *E. compositus*, var. *discoideus* have showy ligules, it is disconcerting, to put it mildly, to those whose field-experience has taught them that the scattered or few almost rayless individuals which, by close watching, may be found in a large colony of definitely ligulate *Erigeron strigosus*, are casual sports—it is disconcerting to see that a monographer of the genus maintains as a good variety *E. strigosus*, var. *discoideus* Robbins, the plants with "ligules about equalling the

disk", *i. e.* essentially invisible, and then, on top of that, adds as a "var. nov." the plants with ligules obsolete, these being var. *eligulatus* Cronquist. Now, as stated, careful observers know that such aberrations (of the plants) are not true varieties, in the sense of having definite ranges. It should be noted, therefore, that when var. *discoideus* of Robbins was published by Gray, Man. ed. 5: 237 (1867) it was not given a separate paragraph nor was its name in bold-face type. As Gray explicitly stated, p. 16, it was one of the variations "which cannot be doubted" to belong in the species, while those to which he gave independent paragraphs and bold-face type (*Thalictrum purpurascens* var. *cerif-erum*, *Ranunculus Flammula* var. *reptans*, or *Geum radiatum* var. *Peckii*, for example) were "so distinct and peculiar that they have been, or readily may be, taken for species." The varieties of Gray's first group are often such as are now generally considered to be *forms*, a term which he did not use in its technical sense. As reflecting the understanding of those whose field-observations have been exceptionally accurate, one may quote Dame & Collins, in their Flora of Middlesex County, Massachusetts, 49 (1888) under *E. strigosus* "the form known as var. **discoideus**"; while the reduction of it essentially to synonymy by Gray (Synoptical Fl.) and its omission by Britton & Brown are eloquent. As a striking form forma *discoideus* is interesting but the difference from it of var. *eligulatus* seems not very practical nor necessary.—M. L. FERNALD.

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Rhodora

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Vol. 50. October, 1948. No. 598.

THE CONFUSED BASES OF THE NAME PINUS PALUSTRIS

M. L. Fernald

While Dr. Schubert's and my study of the only probably existing type of *Pinus palustris* Mill. Gard. Dict. ed. 8, species no. 14 (1768) was in course of publication in Rhodora, 1. 181–186 (1948) Dr. E. L. Little, Jr. of the Forest Service was publishing, in Phytologia, ii. 457–458 (1948), a conclusion which was quite contrary to ours. Subsequently I have received from Mr. W. A. Dayton a letter in which he pleads for the retention of the name *Pinus palustris* for Longleaf Pine and a statement that Little had shown that the name, *P. australis* Michx. f. Hist. Arb. Am. i. 64, pl. 6 (1810), was an illegitimate substitute, because after his diagnosis Michaux filius had cited "*P. palustris.* Linn." Dr. Schubert and I had felt that *P. australis*, described in great detail, beautifully illustrated and clearly understood by the younger Michaux, who had for years known it with evident understanding, was a wholly legitimate name, the synonym "*P. palustris*, Linn." being what nowadays would be cited as "sensu L.", although Linnaeus had no such species. The younger Michaux not only clearly defined, discussed, illustrated and knew the species; he specially pointed out (p. 85) that it could not be what some others, including "Linn.", i. e. Willdenow, but notably Lambert, had described as *P. palustris*. F. A. Michaux was definitely defining a new species, not merely publishing a substitute-name, in the manner of Salisbury and some others.

As already shown, the only extant specimen which bears in a hand, possibly Miller's, the identification as *P. palustris* is a leafy branch of *P. Taeda* L. and Miller's account of the wood and the habitat are those of the early stands of *P. Taeda*, not those of *P. australis*. The phrases in Miller's account which seem vividly to impress those who wish to keep the names they have learned are "foliis longissimis", "the longest leaves" and "leaves are a foot or more in length", without too much regard to the characters which do not belong to *P. australis*. As already noted, "longissimis" could well have been in contrast with the relatively short-leaved species more familiar to both Miller and Du Hamel (quoted by him). The "foot or more in length" is the only contradictory phrase.

Although *Pinus palustris* dates nomenclaturally from 1768, the first edition of Miller's Dictionary in which binomials were somewhat consistently used, Miller's treatment there was a considerable departure from his first account. The species was, apparently, first defined in Mill. Gard. Dict. ed. 3, iii. sp. no. 19 (1737) as

> 19. Pinus *Americana palustris patula, longissimis & viridibus setis.* Marsh spreading *American* Pine, with the longest green Leaves.

and, some pages beyond, Miller went on:

> All these Sorts of *American* Pines should be planted on a Soil rather moist than dry, but especially the nineteenth Sort, which grows naturally on low moist boggy Places, and will not thrive on a dry Soil. This Tree hath a very remarkable Growth; for the Branches spread on the Ground to a great Distance from the Stem, and never rise in Height ["patula"].

Not only the habitat, "low moist boggy Places", but the "very remarkable Growth" is completely wrong for *P. australis*. For an unprejudiced account of Longleaf Pine see Charles Mohr, *The Timber Pines of the Southern United States*, U. S. Dept. Agric., Div. Forestry, Bull. no. 13 (1896). There plates I and II show the branches certainly not "spread on the Ground to a great Distance from the Stem, and never rise in Height". In other words, the original Pinus *Americana palustris patula* of Miller had little in common with Longleaf Pine.

By 1741 (date acc. to Pritzel), in his ed. 4, Miller slightly modified his description, dropping out the words "*patula*" and

"spreading". His discussion, however, showed that whatever he called *P. Americana palustris* was neither successful nor appreciated in England:

> "There are very few Plants of the nineteenth Sort at present in *England*, which are grown to any Height; but some Years ago there were many of them growing at Mr. *Ball's*, near *Exeter*, which were upward of ten Feet high; but these were destroyed by their Owner, who did not like them: this Sort grows on Swamps in *America*," etc.

By the 7th edition (1759) Miller began to share responsibility with DuHamel and had "been informed" and had "not heard" of various items which he repeated in his binomial ed. 8 (sp. no. 14), quoted by Fernald & Schubert. These add nothing to one's confidence that *Pinus palustris* was really or primarily Longleaf Pine.

Then came the era of still further misunderstandings and misinterpretations. In 1787 Wangenheim published his Beytrag zur teutschen holzgerechten Forstwissenschaft, die Anpflanzung Nordamericanischer Holzarten, a work in which many statements were made which were at once seized upon, by those who had no first-hand experience with our trees, as the last word. It was Wangenheim's account of the habitat, range and wood of "Pinus palustris" or "Swamp Pine", as quoted in translation by Lambert[1] in his Descr. Gen. Pinus, 27, 28, t. 20 (1803), which finally persuaded F. A. Michaux (his p. 85) to abandon the name *P. palustris* for Longleaf Pine; and surely anyone who knows *P. australis* must agree that Lambert was as badly confused as was Miller. The great brush of foliage, with staminate aments, was not from Miller but was drawn from one brought back "by that indefatigable collector, Mr. John Fraser", who was not born until 13 years after Miller's first account of his PINUS *Americana palustris*. The cone, described by Lambert "*Strobili* spithamaei, subcylindracei, recti, tuberculoso-muricati, spinis brevibus, in-

[1] The various editions of Miller's Dictionary, whether folio or "abridged", are obscure enough to follow but Lambert's Description of the Genus *Pinus* was one of the most republished and rearranged of works, to the point that in Journ. Linn. Soc. Lond. (Bot.), xlviii. 439–466 (1930) Renkema & Ardagh were forced to use 28 pages in order to enumerate and clarify the very many issues, rearrangements of plates and other changes. Fortunately for us, the treatment in the folio issue of ed. 1 (1803) was not materially changed in "Editio minor" of 1832. In the former tab. 20 consists of a staminate flowering branch, with great brush of foliage 4 dm. across, a cone and details: in the latter these illustrations are cut apart, tab. 24 being three-eighths of the brush, tab. 25 the cone and details.

curvis, obsoletis", is, on the other hand, what at Miller's establishment, the Chelsea Gardens, was supposed to belong to Miller's species, Lambert definitely saying: "I am indebted to Mr. Fairbairn, of Chelsea Gardens, for the cone from which that in the plate was drawn".

Now, the cone of Longleaf Pine, as well illustrated by F. A. Michaux, who intimately knew the tree, by Mohr, l. c. plates V and VI, who was considered by the Division of Forests competent to prepare a memoir, by Faxon in Sargent, Silva, xi. t. dxc or by Shaw, Genus Pinus, pl. xxviii (1914) and by very many preserved specimens, has the central apophysis of each scale with a strong and recurved unguiculate short spine, very tough and sharp in dried cones. Examination of the drawing of the cone which, at Chelsea Gardens nearly a century and a half ago, was preserved as representing Miller's species, shows apophyses projected forward and not with a recurving short spine ("spinis brevibus, incurvis, obsoletis"). This drawing at once set the standard and was copied repeatedly—by Loudon, James Forbes (Pinetum Woburnense) and others; but if accurately drawn (and who can doubt it?) it could hardly have come originally from Longleaf Pine. It is, however, very similar, in the central umbo of the scale, with the prickle obscure ("obsoletis") and not recurved, to the cone of the common eastern Mexican *P. montezumae* Lambert, Descr. Pinus, ed. of 1832: t. 22 (1832). *P. montezumae* was a renaming of *P. occidentalis* sensu HBK. (1817), not Swartz; Kunth, in describing it, citing many stations, including Mt. Orizaba and others within or adjacent to the state of Vera Cruz. Comparison of Lambert's cone, which at the Chelsea Gardens was supposed to represent Miller's *P. palustris*, with the illustration of Lambert's original cone under his *P. montezumae* or with those shown as *P. montezumae* in Shaw's Pines of Mexico, pl. xiv (1909) or his Genus Pinus, pl. xxv (1914) shows not much to distinguish them. It is impossible to scan the pages of Miller's ed. 8 without noting hundreds of entries such as the following: "sent me from La Vera Cruz, by the late Dr. Houstoun" (*Jussiaea*, no. 5). In other words, Dr. William Houstoun (1695–1733), Surgeon to the South Sea Company, was regularly supplying the Chelsea Gardens with material from Vera Cruz and other areas in eastern Mexico. What more

probable than his including fruits of the more conspicuous trees? It does not add to the clear identification of Longleaf Pine as Miller's *P. palustris*, that his successors at Chelsea Gardens and the learned Dr. Lambert (and his many followers) should have used to illustrate it a cone which obviously did not come from Longleaf Pine. Incidentally, as already noted, since the only preserved specimen which may have been identified by Miller as his *P. palustris* is a foliage-specimen of *P. Taeda* L., the conclusion is obvious.

If other evidence were needed that the name *Pinus palustris* covered several species and is not clearly identifiable with just one, it can easily be found—it makes itself very obvious. For instance, Poiret, in Lam. Encyc. v. 341, sp. no. 12 (1804), writing at approximately the same time as Lambert's first edition and citing the stock phrases of DuHamel, Miller and others, about a tree of "les lieux humides & marécageux", but with leaves only "longues de huit à neuf pouces", gave a rather startling account of its immediate distinction from other pines because of "la position de ses feuilles toutes unilatérales ou attachées à un seul côté des branches", this reading, not like a description of the heavy brushes of overlapping fascicles of Longleaf Pine but very much like an account of a branch with a single unilateral row of fascicles of *Pinus patula* Schlecht. & Chamisso of Vera Cruz and adjacent states of eastern Mexico. See Shaw, Pines of Mexico, pl. xxii. This again shows the utter confusion which early interpreters of Miller's hearsay species, *P. palustris*, added to the problem; and when Lambert in a monograph of the genus so sumptuously published as to look authoritative to those who did not trouble to check the sources, swallowed whole everything Wangenheim had written he showed as blank ignorance of Longleaf Pine as did Miller. As noted above, it seems to have been this inclusion of Wangenheim's impossible account which forced F. A. Michaux to abandon the name *P. palustris*, for he cited as "défectueux" details of Lambert's plate and quoted Lambert's account of the wood, etc. as offering a description "de toute manière, une telle disparité avec la mienne". Lambert's summary from Wangenheim, also translated by Michaux into English and French, was as follows:

> Wangenheim found it in Pennsylvania, as far northward as forty degrees latitude, but there, he remarks, it is generally solitary and the

> offspring of cultivation . . . Dry, elevated land does not seem to suit it, but low marshy spots sufficiently sheltered, says Wangenheim. . . . The *bark* is grey and much cracked upon old trees. The *wood* is of a reddish white colour, soft, light, and very sparingly impregnated with resin; it soon decays and burns badly. It is so little esteemed, that as long as any other kind of wood is to be had, not the least use is made of it.

Compare the authoritative statements in Mohr's splendid account published by the Division of Forestry:

> The northern limit . . . on the coast near the southern boundary of Virginia (p. 30) . . . [in] The Atlantic pine region . . . The highly siliceous soil of these pine barrens offers but little inducement for its cultivation . . . by far the greater part of the timber standing has been tapped for its resin . . . impregnated as they are with resin, are used for piling and for posts of great durability (pp. 31, 32) . . . The wood of the Longleaf Pine is hardly surpassed by any of our timber trees . . . in naval architecture, for masts and spars; . . . for the building of bridges, viaducts, trestlework . . . Whenever the sapwood . . . is laid bare copious exudation of resin takes place and the surrounding wood becomes charged with it. Thus the wood . . . soon becomes charged with this . . . and . . . the wood increases in weight and durability. (pp. 46, 47) . . . The trunk is covered with a reddish-brown bark . . . scaling off in thin, bluish, almost transparent rhombic flakes (p. 49).

It is certainly impossible to reconcile Mohr's authoritative account with that of Wangenheim, which has been copied and recopied from its start and which, surely, was not based on real Longleaf Pine. Incidentally, if Longleaf Pine had spread from cultivation northward to the latitude of Philadelphia, it is remarkable that that untiring group of local explorers from Barton to Porter and the present corps of active botanizers, have not seen it, especially when they have laid such stress on everything which wanders outside the garden-fence.

It should be quite apparent that *Pinus palustris* started as a vague conception, the only extant specimen possibly identified by Miller being of *P. Taeda* L.; that with the addition of further items, largely by Miller, the identity became more confused; that Wangenheim wholly tangled the identity and that his followers from Lambert on further made "confusion worse confounded" of the concept. When F. A. Michaux broke from line and properly defined and illustrated Longleaf Pine as *P. australis* he clarified the situation. His clarification was accepted by many of the most careful students up to 1880, when Sargent

revived the name *P. palustris*. One other name has been cited, this antedating *P. australis*. I refer to *P. lutea* Walt. Fl. Carol. 237 (1788). This is commonly cited as identical with "*P. palustris*", but Walter's diagnosis of 7 words was inconclusive. Of *P. palustris* he said "spinis adscendentibus", not good for Longleaf Pine; of his *P. lutea* "spinis rectis", equally poor. Fraser had four sterile leafy branches of Walter's pines in his Herb. Walt. If the thoroughly clear *P. australis* Michx. f. is unsatisfactory to some, they could make an anatomical study of the leaves of the pines preserved in the Fraser volume and presumably find that one of the long-leaved branches is from Longleaf Pine, the other from Slash Pine; then they would have to decide convincingly which of them was meant by Walter's *P. lutea*.

In Phytologia, ii. 451–456 (1948) Dr. Little stated that he would "prohibit" in the future the revival of old names, because careful study of types or bases of old but heretofore not accurately typified names often leads to inconvenient changes, inconvenient to those who have learned and are satisfied with the wrong name. His proposition supplements one by Mr. W. A. Dayton in Journ. Forestry, xli. 373 (1943) "to disallow priority changes due to later discoveries in obscure books 100 years or more old". But certainly the names in many supposedly available works often lead to change. Undoubtedly, when Miller's hundreds of types (if they can be found) are hunted out and carefully studied, they will upset some later names; but if taxonomic work is to involve the exact typification of species, as it should, we must carefully check the identities of species long ago described but too long neglected. An edict sponsored by scientists of any government, which would *prohibit* further investigation of basic facts or factors in chemistry, physics, geology, history or other fields of learning would be an intellectual boomerang and not to the credit of the sponsoring agent. True science is not the outgrowth of shackling.

Everyone is inconvenienced by change from the rut in which he has proceeded but ruts are not the best routes to thorough understanding. Personally I have seen tremendous changes in the current names of plants of the area I best know. As a young man I used Gray's Manual, ed. 5; later ed. 6; then ed. 7; and I am

trying to finish ed. 8. Of the names of vascular plants described in ed. 5 at least 45% have been changed through restudy of the plants or their nomenclatural types or through changes in the International Rules of Nomenclature; of the names accepted in ed. 6 33% have been changed; of those in ed. 7 at least 30%. All this has been very inconvenient; but it is very doubtful if scientists would have welcomed at any of these dates a prohibition of further study of the types. Several times writers on forests at Washington have issued supposedly authoritative lists of names of our trees. In 1884 the federal government issued Sargent's Catalogue of Forest Trees. If the prohibition of change had then been in force we should be writing *Magnolia glauca* (instead of *M. virginiana*), *Acer saccharinum* (instead of *A. saccharum*) for the northern Sugar Maple, *Rhus venenata* (instead of *R. Vernix*), *Nyssa uniflora* (instead of *N. aquatica*) and *Chamaecyparis sphaeroides* (instead of *C. thyoides*). Those would be the names I first learned and gray hair accompanying the unlearning might have been delayed. In 1898 (14 years later than Sargent's Report) a Check List of correct names was issued by the Division of Forestry. If there had been governmental prohibition of any changes after that we should be under orders to write *Pinus divaricata* but the Check List of 1927 called it *P. Banksiana* (but as "banksiana", perhaps because growing on a bank). At both those dates Pecan was called *Hickoria pecan* but now Dr. Little (happily) discards both the generic and the specific names; and so on with many others. It would have pleased me if the names I learned in the late 80's had never changed; it would have been convenient to stop at any of the other magic dates; but would that have been real progress, if our nomenclature and identifications are to rest on exact study of types, not on hit-or-miss guesses?

Prior to the International Congress of 1930 a proposition was pushed, to conserve the names of important economic plants from the changes which might come from applying to them the principle of priority of publication. But almost immediately, as I saw in going over the responses with Dr. Sprague at Kew, botanists of different age-groups in the same countries saw an opportunity to conserve all the binomials they had learned. This formula, followed in many countries and by different

generations, caused the prompt withdrawal of the proposition. Those who earnestly wish conservation of really very important names of economic plants should proceed with care, looking out that their would-be conserved names rest upon undoubted types. The seeking out of types and their conscientious study is an exacting task, neglected by many, but conservation based on accumulated errors, such as surrounded all the early accounts of *Pinus palustris*, is not worth the name. We are not, as scientists, aiming to perpetuate error.

THE PROPOSED CHANGES IN ARTICLE 58, INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE[1]

Norman C. Fassett

The present Article 58 of the International Rules of Botanical Nomenclature provides that " . . . when a group changes its rank, the earliest legitimate name or epithet given to the group in its new rank is valid, . . . " The proposed changes, originally submitted by Professor Rehder (Journ. Arnold Arb. **20**: 275. 1939) and somewhat modified by the Central Committee on Nomenclature of the American Society of Plant Taxonomists, specify that "When no legitimate name exists in the new rank, the earliest existing name or epithet in any rank must be retained . . . For purposes of nomenclatural priority, all subdivisions of species are regarded of the same rank."

The proposed changes are not retroactive; if they were the mortality might be high. But, to see how this rule might work

[1] For the benefit of such of our readers as have not seen it, the proposal in regard to Article 58, as sent out by the Central Committee on Nomenclature of the American Society of Plant Taxonomists is here reprinted in full.

"Art. 58. Change the basic Article to read as follows and *delete* paragraphs (2) and (3) of Rec. XXXVI:

"When a tribe becomes a family, when a subgenus or section becomes a genus, when a subdivision of a species becomes a species, or when the reverse of these changes takes place, the earliest legitimate name or epithet given to the group in its new rank is valid, unless that name or the resulting association or combination is a later homonym. (see Arts. 60, 61).

"When no legitimate name exists in the new rank, the earliest existing name or epithet in any rank must be retained, unless the resulting association or combination is a later homonym (see Arts. 60, 61); but this applies only to names published after Jan. 1, 1953.

"For purposes of priority, all subdivisions of species are regarded as of the

in the future, we may examine what would have been the result if it had been in force in the past.

The northwestern phase of *Phlox pilosa*, from Wisconsin and Illinois westward to the Dakotas and eastern Kansas, differs from the eastern phase of the species in the lustrous glandless hairs in the inflorescence; it was named *P. pilosa* var. *fulgida* Wherry, Bartonia, no. **12**: 47. 1931. But the earliest name, as any subdivision of a species, based on a type identifiable with var. *fulgida*, is *P. pilosa* f. *albiflora* MacMillan, Metasp. Minn. Vall. 432. 1892, founded on one of the rather uncommon white-flowered individuals such as are occasionally found among the mass of purple-flowered plants. Under the proposed rule, all the plants now known as var. *fulgida* would carry a varietal name signifying, not that they have lustrous hairs (true), but that they have white flowers (nearly always false). We could, of course, then coin a quadrinomial for the common phase of the population, following the varietal name (stating that the flowers are white) with a formal name (stating that the flowers are *not* white).

The northern representative of *Epigaea repens* differs from the scabrous-leaved southern plant by having the leaf-surfaces nearly or quite glabrous, and has been described as *E. repens* var. *glabrifolia* Fernald, Rhodora **41**: 446. 1939. The earliest name, as any subdivision of a species, based on a type from the north, is *E. repens* f. *plena* Rehder, Journ. Arnold Arb. **7**: 244. 1926, describing an exceptional individual with petaloid stamens.

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same rank, except as provided for subdivisions containing the type of the species.

"Examples may be retained.

—Argument—

"The practice of changing names or epithets on change of rank was rather common in the past; it is, however, contrary to both the spirit and letter of the present Rules (see Arts. 4 (paragraph 2), 59 and 60 (2)), and Rec. XXXVI shows quite clearly the intent of the Congress to stop it. Nevertheless, some recent authors have changed epithets with change of rank, for no better reason than that they regarded available epithets already existing as inappropriate. The proposed amendment is intended to make perfectly clear that this practice is illegitimate. It cannot be made fully retroactive without causing much confusion in past nomenclature; its application is accordingly fixed with a future date so that there will be no additional confusion.

"Proposed by: This is a proposal combining elements of that submitted by Alfred Rehder (Jour. Arnold Arb. 20: 275. 1939—which see for his argument), together with further additions and modifications made by the Committee."

No alternative proposal was received by the Committee.—C. A. W.

Under the amended Art. 58, our northern Trailing Arbutus would carry a name implying double flowers, a phenomenon observed, apparently, but once. Again, a name originally intended to distinguish an exceptional individual from the bulk of the population would be forced upon that entire population. The author of f. *plena* intended, of course, to give the name *plena* to the double-flowered minority, not to the single-flowered majority.

Discovery of the fact that the type of *Streptopus roseus* Michx. represents the rather local southeastern extreme of the species necessitated the coining of a new varietal name for the common *S. roseus* of the eastern United States and Canada. The present writer gave it a name meaning "well-known," calling it *S. roseus* var. *perspectus* Fassett, Rhodora, **37**: 109. 1935. It happens that in the far western variety of *S. roseus*, branching stems are rare, and in the middle western variety a majority of plants have simple stems, while in var. *perspectus* the vast majority of plants have branching stems. One of the rare unbranched individuals so impressed Brother Victorin as something unusual that he described it as *S. roseus* f. *simplex* Victorin, Contrib. Lab. Bot. Univ. Montreal, no. 14: 23. 1929. Had the amended Art. 58 been in force in 1935, the most freely branching phase of *Streptopus roseus* would now be bearing a varietal name based on f. *simplex*, and botanists in general would be asking by what logic these taxonomists concoct their names.

Brother Victorin would never have been silly enough to give the name *simplex* to the most freely branching variety of *Streptopus roseus:* what adjective can we apply to a rule that would have forced this unintended application of his name?

The point is, a majority of taxonomists have made a distinction between subspecies, varieties and forms. In the last-named category, there is a vast assemblage of names based on albinos, double flowers, simple stems, and other trivial states, coined to point out something unusual: these would be highly inappropriate and contradictory if forced to embrace the whole population from which the author of each name intended only to differentiate the unusual thing.

The argument for the change in Art. 58 seems to be, mainly, that " . . . some recent authors have changed epithets with

change of rank, for no better reason than that they regarded available epithets already existing as inappropriate." Is that bad? Admitted, we cannot indulge, as did Rafinesque and C. G. Lloyd, in wholesale rejection of names that do not appeal to our fancy; admitted, consistent application of rules unavoidably results in an occasional inappropriate name. But is this a reason for deliberately changing the rules to force the adoption of inappropriate names in a sense different from that originally intended by their authors?

Art 58 states that the earliest name *in the new rank* is valid; a footnote to Art. 16 states that "the valid name is the binary or ternary combination containing the earliest epithet published with the same rank." To bring Art. 55 into line with these rules, phrase (2) should read:

"that there is available an earlier validly published subdivisional epithet in the same rank." In Art. 60 (2), the phrase "in the correct rank" should be added after the word "epithet." Modification of Art. 59 is not necessary, for that article carries no injunction against a well-chosen name if its adoption is not out of harmony with the rest of the rules.

To Art. 58 the following example might be added: *Peltigera canina* var. *rufescens* f. *innovans* (Körb.) Thomson, Trans. Wis. Acad. **38**: 265. 1947, is based on the earliest valid name as a forma, *Peltigera rufescens* f. *innovans* Körb. Syst. Lich. Germ. 60. 1855, not on *Peltidea ulorrhiza* var. *praetextata* Flk. apud Sommerf. Suppl. Flor. Lappon. 123. 1826.—N. C. F.

Department of Botany,
University of Wisconsin.

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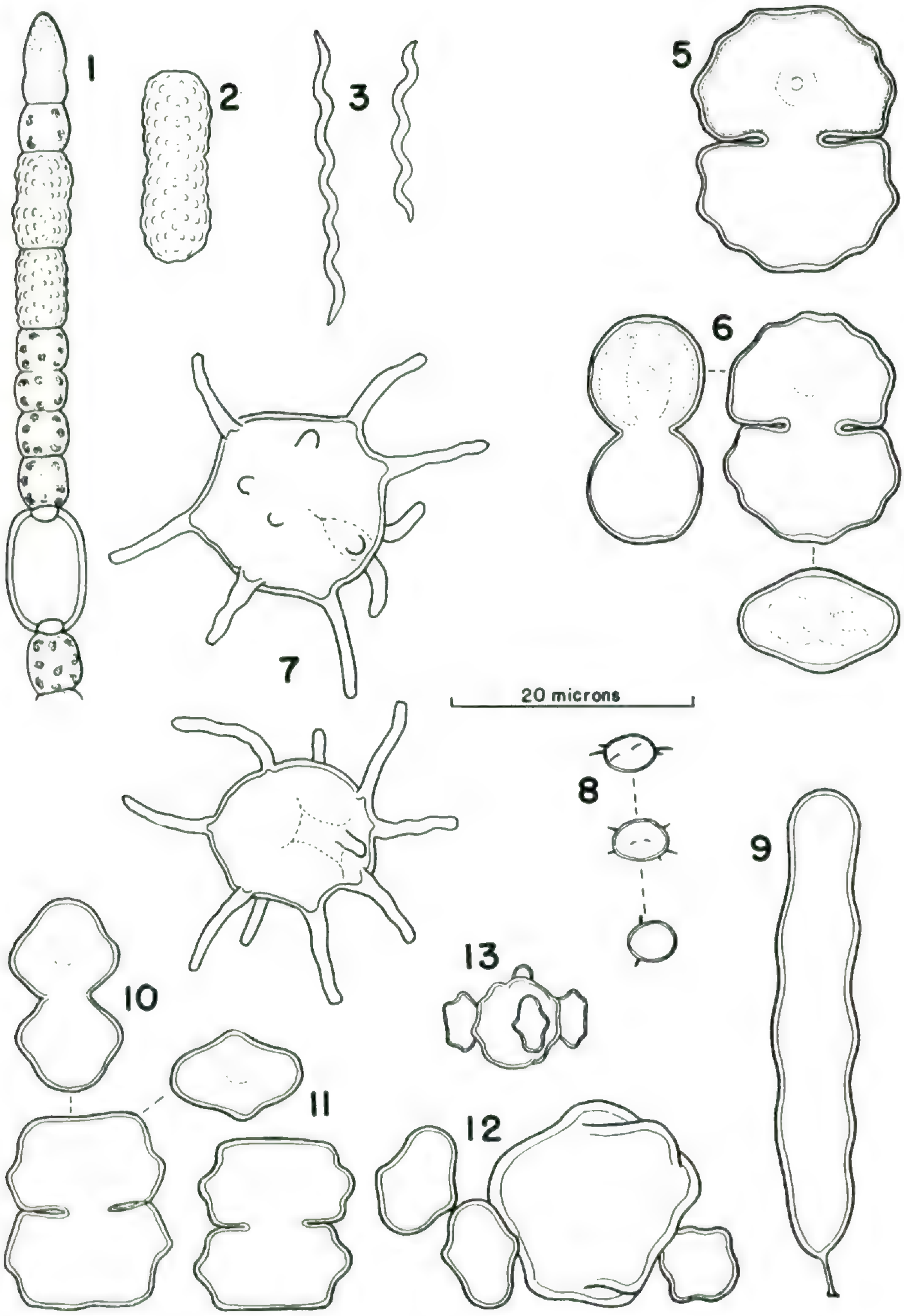
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THE FLORA OF PENIKESE, SEVENTY-FOUR YEARS AFTER

I. PENIKESE ISLAND MARINE ALGAE

MAXWELL S. DOTY[1]

In 1873 and 1874 Penikese Island, one of the southernmost of the Elizabeth Islands, off the southern elbow of Cape Cod, was the site of the first marine biological station in North America. Though it was in operation only two years, the enthusiasm for marine biology engendered by the founder, Louis Agassiz, swelled and endured. It persists today in the sincere aggregation of organizations assembled at Woods Hole, Massachusetts. In commemoration of that initial effort, a fifty-year resurvey of the flora and fauna of the Island was completed in 1923, the floral portion being published under the editorship of Lewis (3). In preparation for the celebration of the seventy-fifth anniversary, several visits were made to this historic site during the summer of 1947. The major findings insofar as marine algae are concerned are listed below. The findings of other botanical materials will be reported in subsequent papers.

In 1874 Jordan (1) published a list of 81 species of algae found during the operation of Agassiz' school. Shortly after the founding of the Marine Biological Laboratory and the U. S. Bureau of Fisheries station at Woods Hole, a marine biological survey of the region was undertaken. Davis (2) published the botanical results in 1913. Other publications (e. g. 3, 4, 5, 6, 7),

[1] Department of Botany, Northwestern University, Evanston, Illinois.

largely of Taylor's work, have amplified and modified the list of algae known from Penikese. It is unfortunate that only a very small amount of the material foundation for the published records is known to be extant. Some of this material was reinvestigated (4) and some of the earlier records shown to be probably incorrect. Some of the early recorded species are not now recognized as specifically distinct; some of the specific names used earlier are currently considered to be synonyms. An effort is made here to assemble the records of Penikese Island algae, sort out the synonyms and point out which of the old records are unique.

In an effort to accomplish this end in a concise manner that will still indicate the opinions of the original authors the following treatment is given. Names that are accepted as valid for the purposes of this paper appear in small capital letters. Names which for the purposes of this paper are considered as synonyms in reference to reports of Penikese algae appear in italics. The numbers following entries in the lists below refer to the publications in the list of literature in which that species is reported from Penikese. Key citations for species not previously reported from the Northwest Atlantic by Taylor (8) and for names not previously used for species found in this area are given by similar numbers in parentheses following the authority name. The letter "A" indicates that the species was reported from the Island on good authority by one or more of the investigators visiting the Island during the summer. A "B" indicates that herbarium material was prepared and is to be found in the herbarium of the Marine Biological Laboratory or in the herbarium of the collector. The four-place numbers above 5000 identify herbarium specimens in the author's herbarium.

At least one collection of each blue-green algal species reported here has been identified by Dr. Francis Drouet of the Chicago Museum of Natural History. The determinations of Cladophoraceae have all been made or checked by Dr. Harry Phinney of Oregon State College. The determinations of many of the microscopic Rhodophyta were made by Mrs. Isabella Abbott of the University of California. Many of the more interesting observations and collections were provided by Dr. Hannah T. Croasdale of Dartmouth College. The author has had the

privilege of drawing upon the herbarium and experience of Prof. Wm. Randolph Taylor in many instances. Most of the collecting of materials was done by the following who accompanied the author on trips to the island and collected as three teams: Miss Marie Boyle, Mr. Remi J. Cadoret, Miss Elizabeth M. Fahey, Miss Amy Gage, Mr. Edwin Moul, Mr. Leonard Spiegel, Prof. Wm. Randolph Taylor, Dr. R. D. Wood, Mrs. Urda Wood—whose cooperation was greatly appreciated.

The floral, and probably the faunal, associations are delimited vertically in such a way that the intertidal area seems broken into four zones. Serially the uppermost of these zones has been named *adlittoral*, and the remaining three, in order, after Feldmann (9), *supralittoral*, *littoral*, and *infralittoral*. From a distance or from an aerial photograph these appear from the uppermost downwards as a white zone, largely bare boulders devoid of vegetation, above the normal reach of the spray; a blackish zone dominated by blue-green algae extending from the highest tide and normal spray levels down to approximate mean high tide level; a brown zone extending from approximate mean high tide level to approximate mean low tide level; a darker brown zone, including many of the Rhodophyta, extending down at least 10 meters, and probably much farther, below approximate mean low tide level. Subdivisions of these major zones may be recognized as various *horizons* correlated with various tide levels and supporting associations characteristically dominated by different algal species. At the head of each divisional list notes on the dominant members of one or more associations are given. No attempt has been made to indicate all the associations or their distribution around the Island. No major differences between the situation as reported by Lewis (3) and the current situation were noted other than the further destruction of Gull Island, perhaps due to its being used as a practice-bombing target during the war and during the survey. Accordingly, no close investigation was made of Gull Island.

SCHIZOPHYTA

No consideration was given to members of this division other than "blue-green algae." Herbarium materials of all species found by the present survey are deposited in the herbarium of the

Chicago Museum of Natural History. In general the species may be recognized as belonging in one of three categories. The first of these is of species that are restricted to peculiar habitats or particular hosts. As examples we might list *Calothrix parasitica* in the fronds of *Nemalion* and *Aegira* or *Isactis plana* on the fronds of *Punctaria*. The second category consists of the species generally distributed in and on the calcareous remains of molluscs and similar substrata. Species such as *Hyella caespitosa*,[2] *Mastigocoleus testarum*, *Lyngbya lutea* and *Plectonema terebrans* may be listed here. A third category of species consists of the algae contributing to the conspicuous "Calothrix-zone," the supralittoral zone of Feldmann (9). Because of their interest here from a physiologico-ecological viewpoint (10) particular attention was paid to this association. Here, though *Calothrix crustacea* and *Plectonema calothrichoides* are perhaps the most frequent or dominant, other species such as *Calothrix scopulorum*, *C. vivipara*, *Entophysalis granulosa*[2] and *Plectonema norvegicum* are frequent. Late in the season *Rivularia atra* became conspicuous near mean high-tide level as hard, gelatinous, black, pin-head-sized hemispheres on the barnacles and rocks. It had been present earlier as an inconspicuous occasional alga on stones near mean low water.

Anabaena torulosa (Carm.) Lagerh. 3.
Calothrix confervicola (Roth) Ag. *ex* Born. & Flah. 1, 3.
Calothrix crustacea Born. & Flah. 3, A, B 7018, 6956.
Calothrix fuscoviolacea Crouan. 3.
Calothrix parasitica (Chauv.) Thur. & Flah. 3, B 6958a.
Calothrix scopulorum Born. & Flah. 1, 3, B 6958.
Calothrix vivipara Born. & Flah. B.
Entophysalis granulosa Kütz. B 7018, 6957.
Hydrocoleum lyngbyaceum Gom. 22.
Hydrocoleum glutinosum (Ag.) Gom. 3, 22.
Hyella caespitosa Born. & Flah. 3, A, B.
Isactis plana (Harv.) Thur. *ex* Born. & Flah. 3, A, B.
Lyngbya aestuarii (Mert.) Liebm. 3.
Lyngbya lutea Gom.? B.
Mastigocoleus testarum Born. & Flah. 3, B.
Oscillatoria margaritifera Kütz. 3.
Phormidium papyraceum (Ag.) Gom. 3 (but see 22).
Plectonema calothrichoides Gom. B.

[2] Forms found on shells between tide levels that otherwise could very well have been identified with *Entophysalis granulosa* have been treated as *Hyella* species.

PLECTONEMA NORVEGICUM Gom. B 6958.
PLECTONEMA TEREBRANS Gom. B.
RIVULARIA ATRA Roth *ex* Born. & Flah. 3, A, B.

CHLOROPHYTA

Prasiola stipitata often appears in characteristic fashion in the supralittoral zone (8, 11). On often sprayed rocks in the same zone elsewhere green algae are conspicuous as associations of stunted *Blidingia minima* and, with abnormally upwardly displaced *Fucus*, forms of *Ulothrix flacca*. Where there is an exposure either to fresh water or in pools where the salinity is apt to vary considerably beyond the normal range of variation, associations of *Enteromorpha intestinalis* are apt to appear. These latter three associations may, very likely, really belong with the next lower level, or at least to the same horizons as *Fucus spiralis*.

In the littoral zone little was found in the way of more or less enduring associations in which green algae were dominant forms. Often here, though, such forms as *Ulothrix flacca* are conspicuous in limited areas or, as reported by Fahey & Doty (12), *Enteromorpha* species make their appearance as relatively transitory dominants.

In coves and along open shores among boulders, and so in a way protected, *Enteromorpha linza* will often be a dominant form, usually definitely above *Ulva Lactuca*. In the most protected parts of the embayment between Tub Point and the main part of the island *Ulva Lactuca* var. *latissima* becomes conspicuous attached there to shells and stones on the sandy mud at about mean low water level. At no place was *Cladophora* (see Lewis, 3) a dominant alga.

BLIDINGIA MINIMA (Näg. in Kütz.) Kylin (24). 3, A, B.[3]

All forms found were small and unbranched (e. g. 7159, 7143, 7123).

[3] BLIDINGIA Kylin

Thalli tamquam proliferatio una vel plures e lamina in centro duarum cellularum crassa orientes, non ramosi ramosive, basibus ramorum latis factis; cellulae uno chloroplasto atque plerumque uno pyrenoideo praeditae, non ordinatae vel in ordinibus irregularibus dispositae, plerumque diametro 5–7 μ, membrana saepius fere crassitudine eadem; reproductio asexualis per zoosporas nonphototacticas, astigmaticas, quadriflagellatasque; reproductio sexualis ignota.

Type species: *Enteromorpha minima* Nägeli in Kützing. Species Algarum. 1849.

BRYOPSIS PLUMOSA (Huds.) C. Ag. 1, A, B 7136.
CHAETOMORPHA AEREA (Dillw.) Kütz. 1, A, B 7210.
CHAETOMORPHA LINUM (Müll.) Kütz. 3.
CHAETOMORPHA MELAGONIUM (Weber & Mohr) Kütz. 1, 3.
Chaetomorpha Olneyi 1 = C. AEREA (Dillw.) Kütz.
Cladophora albida 1, 3 = C. REFRACTA (Roth) Kütz.
Cladophora albida var. *refracta* 3 = C. REFRACTA (Roth) Kütz.
Cladophora arcta (Dillw.) Kütz. = SPONGOMORPHA ARCTA (Dillw.) Kütz.
CLADOPHORA EXPANSA (Mert.) Kütz. 3.
CLADOPHORA FLEXUOSA Griff. *ex* Harv. 1.
Cladophora fracta (Müll.) Kütz. 1.

This is probably *C. expansa* (Mert.) Kütz. or *C. flavescens* (Roth) Kütz.

CLADOPHORA GLAUCESCENS Griff. *ex* Harv. 1.
CLADOPHORA GRACILIS (Griff. *ex* Harv.) Kütz. 1, 4, A, B 7263.
Cladophora lanosa 1 = SPONGOMORPHA LANOSA (Roth) Kütz.
CLADOPHORA REFRACTA (Roth) Kütz. 1, 3, A, B 7127, 7150, 7131.
CODIOLUM GREGARIUM A. Braun. A.
Endoderma Wittrockii 3 = ENTOCLADIA WITTROCKII Wille.
ENTEROMORPHA CLATHRATA (Roth) Grev. 1, 3, 4, A.
ENTEROMORPHA COMPRESSA (L.) Grev. 1, 3.
Enteromorpha erecta (Lyngb.) J. Ag. = E. CLATHRATA (Roth) Grev.
Enteromorpha Hopkirkii 1 = E. CLATHRATA (Roth) Grev.
ENTEROMORPHA INTESTINALIS (L.) Link. 1, 3, A, B.

Many of the named forms were found, but of particular interest was a completely compressed linear form (7152) found in a high pool with normally inflated forms near by (*e. g.* 7144, 7142), and a very small tubular form, 7156.

ENTEROMORPHA LINZA (L.) J. Ag. 3, A, B.
ENTEROMORPHA LINZA var. OBLANCEOLATA Doty (13). A, B.

The material (7133) washed in along the southeastern shore of the island is very much like the type material both macro- and

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If one attempts to follow the International Rules of Botanical Nomenclature Kylin's name cannot be considered as anything but illegitimate (a *nomen nudum* under Article 38). Being aware both of Bliding's (Botaniska Notiser. 1938.) detailed work and apparent belief that *E. minima* represented the type for a distinct genus and of Kylin's (24) opinion, the author can do little but make these acknowledgments and follow the above procedure. He could, of course, not follow the rules in this particular case or he could, with or without pretending ignorance of these two authorities' prior opinions, propose an entirely new generic name in the prescribed manner. The same situation prevailed in the case of *Sphaerotrichia* Kylin (15).

microscopically, and distinct from all other Enteromorphoid algae found along either coast. This is the first record from the northwestern Atlantic.

Enteromorpha minima Näg. in Kütz. = BLIDINGIA MINIMA (Näg. in Kütz.) Kylin.
Enteromorpha plumosa 3 = E. CLATHRATA (Roth) Grev.
ENTEROMORPHA PROLIFERA (Müll.) J. Ag. A, B 7009, 6950, 7139, 7124, 7132.

This species is characterized by having the cells typically in rows; even when sometimes the rows are irregular the cells are angular to squarish in outline and in the middle of the membrane, which is usually ca. 12 μ thick. In surface view full-sized cells of this species usually average from 12 to 18 μ long and the rows are usually within this range in width. If proliferous the branches are attenuated basally (e. g. 7140), blunt, rounded, and usually inflated at the apex.

ENTEROMORPHA PROLIFERA var. FLEXUOSA (Wulf.) Doty (13). A, B. In South Pond where the salinity was 13.2 and the pH 9.
ENTEROMORPHA PROLIFERA var. TUBULOSA (Kütz.) Reinb. A, B.

In both South Pond (pH 9; salinity 13.2) and Tub Pond (pH 8.5–9.5; salinity 34.4) mixed with other varieties. The surface of the fronds from South Pond is papillose in cross section due to the convexity of each cell's outer membrane; this phenomenon is less pronounced in the case of specimens from more truly marine habitats. The Feldmanns (14) describe similar experimentally induced modifications of *E. marginata* J. Ag. with variation in salinity.

ENTOCLADIA WITTROCKII Wille. 3, B. On *Ectocarpus confervoides* 6949.
GOMONTIA POLYRHIZA (Lagerh.) Born. & Flah. 3, B 7300.
Hormotrichum Younganum 1 = UROSPORA PENICILLIFORMIS (Roth) Aresch.
OCHLOCHAETE LENTIFORMIS Huber (23). B 7281.

Collected for an *Ulvella* as minute patches of microscopic green crustlets on whitish granitic stones, 7281.

PLATYMONAS SUBCORDIFORMIS (Wille) Hazen. 3.
PRASIOLA STIPITATA Suhr. 3, A, B 7283, 7282.
PROTODERMA MARINUM Reinke. 3, A, B 7064.

Growing on very high rocks giving the highest algal coated rocks a brownish cast, e. g., just north of the stone pier.

Rhizoclonium Kerneri Stockm. 3.
Spongomorpha arcta (Dillw.) Kütz. 1.
Spongomorpha lanosa (Roth) Kütz. 1.

In studying the material collected the author could find no *Spongomorpha* in the collections of the different cooperators, though several specimens so labeled were turned in. All these materials were considered forms of *Cladophora refracta*.

Spongomorpha lanosa var. uncialis (Müll.) Kjellm. 3.
Tellamia contorta Batt. A, B.

In shell of *Busycon* with *Lyngbya lutea?*, 7299.

Ulothrix flacca (Dillw.) Thur. A, B.

On stunted high-growing *Fucus*, 6951; on *Polysiphonia lanosa* collected by Leonard Spiegel; on a *Busycon* shell in the mid-tide levels just north of the stone pier, and on rocks, 6951, along the north end of the island.

Ulva Lactuca L. 3, A.
Ulva Lactuca var. latissima (L.) D. C. 1, A.
Ulva latissima 1 = U. Lactuca var. latissima (L.) D. C.
Urospora penicilliformis (Roth) Aresch. 1.
Vaucheria spp. "allied to *V. murina*" 1.

PHAEOPHYTA

There are no conspicuous brown algal communities in the supralittoral reaches, but in the littoral and below they are the most frequently found dominant forms. The *Fucus spiralis* association in the upper part of the littoral zone with the *Fucus vesiculosus* association just below are perhaps the most generally occurring, with the *Ascophyllum nodosum* association extending about one foot lower than the *Fucus vesiculosus* association, and ranking a close second to the first two in prominence. *Ralfsia verrucosa* becomes dominant on the rocks, barnacles and *Littorina* in restricted localities, such as small coves, in the middle horizons of the littoral zone with or below the *Fucus* and *Ascophyllum* associations. In comparatively quiet waters *Laminaria Agardhii* may be the conspicuous alga just below low tide level

(often along with *Chorda* or *Sargassum*), while in the most exposed situations *Laminaria digitata* may be conspicuous, as around the rocks off the north end of the island. The *Laminaria* associations here as elsewhere in the world seem to be indicators of the infralittoral zone.

ACROTHRIX NOVAE-ANGLIAE Taylor. 4, 19, A, B 7138.
ASCOCYCLUS DISTROMATICUS Taylor. 5.
ASCOPHYLLUM NODOSUM (L.) LeJol. 1, 3, A, B 7188.
ASPEROCOCCUS ECHINATUS (Mert.) Grev. 1, 3.
Castagnea virescens 3 = EUDESME VIRESCENS (Carm.) J. Ag.
Castagnea Zosterae 3 = CLADOSIPHON ZOSTERAE (J. Ag.) Kylin.
CHORDA FILUM (L.) Lam. 2[4], 3, A, B 7189.
Chordaria divaricata 1 = SPHAEROTRICHIA DIVARICATA (C. Ag.) Kylin.
CHORDARIA FLAGELLIFORMIS (Müll.) C. Ag. 1, 3, A, B 7130.
CLADOSIPHON ZOSTERAE (J. Ag.) Kylin (15). 3.
DESMARESTIA ACULEATA (L.) Lam. 2, 3, A.
DESMARESTIA ACULEATA var. ATTENUATA Taylor. 5, A, B 7016.
DESMARESTIA VIRIDIS (Müll.) Lam. 1, 3, A.
DESMOTRICHUM UNDULATUM (J. Ag.) Reinke. 1, 3.
DICTYOSIPHON FOENICULACEUS (Huds.) Grev. 1, 2, 3, A, B 7016.

The author has seen none of the specimens reported as *D. hippuroides*, but feels that species is perhaps but a seasonal variety of the present species, an opinion expressed earlier by Farlow (7).

Dictyosiphon hippuroides 2 = D. FOENICULACEUS (Huds.) Grev.
ECTOCARPUS CONFERVOIDES (Roth) LeJol. 3, A, B 6949.
Ectocarpus confervoides var. *hiemalis* 3 = E. SILICULOSUS var. HIEMALIS (Crouan) Kuck.
ECTOCARPUS FASCICULATUS Griff. *ex* Harv. 3.
Ectocarpus littoralis 1 = PYLAIELLA LITORALIS (L.) Kjell.
ECTOCARPUS OVATUS Kjell. A.
ECTOCARPUS SILICULOSUS (Dillw.) Lyngb. 1, 3, A, B 7166.
ECTOCARPUS SILICULOSUS var. HIEMALIS (Crouan) Kuck. 3.
ECTOCARPUS TOMENTOSUS (Huds.) Lyngb. 3, A.
ELACHISTEA FUCICOLA (Vell.) Aresch. 1, 3, A, B 7147, 7018.
EUDESME VIRESCENS (Carm.) J. Ag. (15). 3, A, B 6959.

Awash in abundance all around the islands during early July; *e. g.* 6952 unilocular, 6959.

FUCUS EVANESCENS C. Ag. A, B.

[4] This, and some other records from Davis' paper, are accepted from the charts in part I.

Fucus nodosus 1 = Ascophyllum nodosum (L.) Le Jol.
Fucus spiralis L. A, B.
Fucus vesiculosus L. 1, 3, A, B.
Fucus vesiculosus var. spiralis Farl. A.
Ilea fascia (Müll.) Fries. 1, A.
Ilea fascia var. caespitosa (J. Ag.) S. & G. (21). 3.
Laminaria Agardhii Kjellm. 2, 3, A, B 7196.
Laminaria ascia 1 = Ilea fascia (Müll.) Fries.
Laminaria digitata (L.) Edmons. 1, 3, A, B 7191.

Collected *in situ* among offshore rocks along the north end of the island about three to five feet below mean low water line.

Laminaria longicornis 1 = Laminaria longicruris De la Pyl.
Laminaria longicruris De la Pyl. 1.
Laminaria platymeris De la Pyl. 3, 6.
Laminaria saccharina (L.) Lam. 1.
Lathesia tuberiformis 1 = Leathesia difformis (L.) Aresch.
Leathesia difformis (L.) Aresch. 1, 3, A, B.

On *Corallina* on the offshore rocks at the north end of the island, 7158.

Mesogloia divaricata 3 = Sphaerotrichia divaricata (C. Ag.) Kylin.
Myrionema balticum (Rein.) Foslie. A.
Myrionema globosum (Rein.) Foslie. A, B.
Myrionema Leclancheri (Chauv.) Harv. 3.
Myriotrichia clavaeformis Harv. 4.
Petalonia fascia 3 = Ilea fascia (Müll.) Fr.
Petalonia fascia var. *caespitosa* 3 = Ilea fascia var. caespitosa (J. Ag.) S. & G.
Punctaria latifolia Grev. 3, A.
Punctaria plantaginea (Roth) Grev. A.
Punctaria tenuissima 1 = Desmotrichum undulatum (J. Ag.) Rein.
Pylaiella litoralis (L.) Kjellm. 1, 3.
Ralfsia verrucosa (Aresch.) J. Ag. 3, A, B 7016, 7276.
Sargassum Filipendula C. Ag. 1, 2, A, B.
Sargassum Filipendula var. Montagnei (Bail.) Coll. & Herv. 1.
Sargassum Montagnei 1 = S. Filipendula var. Montagnei (Bail.) Coll. & Herv.
Sargassum vulgare 1 = S. Filipendula C. Ag.
Scytosiphon lomentaria (Lyngb.) J. Ag. 3, A, B.
Scytosiphon attenuatus Kjellm. (25) (= *Chordaria attenuata* Foslie. 1887. *Tromsø Mus. Aarshefter* 10: 175–195.) (= *Scytosiphon attenuatus* (Foslie) Doty, *Farlowia* 3: 38.)

A new record for the New England flora.

SPHACELARIA CIRRHOSA (Roth) C. Ag. 1, 3, A, B.

Also an undetermined species on *Ahnfeltia* 7169a.

SPHAEROTRICHIA DIVARICATA (C. Ag.) Kylin (15)[5]. 1, 3, A, B.

RHODOPHYTA

As was the case with the brown algae, there seem to be no associations in the supralittoral zone on Penikese that are dominated by red algae. In the littoral zone *Bangia*, often mixed with *Calothrix* or *Codiolum*, may show as a distinct dominant in the upper horizon of the littoral zone. *Polysiphonia novae-angliae* and *Ceramium rubrum*, though extending lower, are frequently dominant forms in the lower horizons of the littoral zone. Lewis (3) mentioned such forms as "noticeably absent" during the 50-year survey. *Hildenbrandia* is often a dominant form between the upper and infralittoral zone species and the *Ralfsia*, *Ascophyllum* and *Fucus* associations of the higher littoral zone. *Chondrus crispus*, extending down at least elsewhere as far as forty feet, and, in exposed places, *Corallina* form conspicuous associations from the upper infralittoral limits downwards at least three meters. On rocks and shells over sandy bottoms, as for example off Tub Point in the bay, *Dasya*, *Ceramium*, and less frequently *Champia* or other genera (usually delicate species) may be dominant Rhodophyta in the lower horizons of the superior infralittoral zone.

ACROCHAETIUM AMPHIROAE (Drew) Pap. (16). B in Herb. I. A. Abbott, 1694.

A new record for the Northwestern Atlantic collected on *Corallina officinalis* by Mr. David Erskine.

ACROCHAETIUM DAVIESII (Dillw.) Näg. 1, A.
ACROCHAETIUM THURETII (Born.) Coll. & Herv. B.

Determined as the forma *agama* of Rosenvinge on *Rhodymenia*

[5] *Sphaerotrichia* Kylin

Phaeophyceae cylindricae, divaricate ramosae; monaxiales, crescentes in longitudinem activitate meristematis apicalis cuius cellula terminalis dilatata globosaque; regio medullaris cava infra facta aut cellulis magnis parenchymatis impleta; rhizoidea solum ad basim adsunt; filamenta assimilatoria brevia, cellulis inflatissimis terminata; pili phaeophyceani meristemate basali praediti; sporangia unilocularia in cortice dispersa e partibus basalibus systematum pilorum enascentia.

Type species: *Chordaria divaricata* C. Agardh. Syn. Alg. Scand. 1817. See footnote under *Blidingia minima* (Näg. in Kütz.) Kylin.

palmata (7149) by Mrs. Abbott, and again (7261) from *Phyllophora membranifolia*, a new generic host for the species.

Acrochaetium virgatulum 3 = Chromastrum virgatulum (Harv.) Pap.
Acrochaetium Zosterae Pap. (16). B 7186.

On the tips of *Laminaria digitata;* forming irregular red flecks and minute tufts on the surface.

Actinococcus subcutaneus 3 = Phyllophora Brodiaei (Turn.) J. Ag.
Agardhiella tenera (J. Ag.) Schmitz. 2, A.
Ahnfeltia plicata (Huds.) Fries. 1, 2, 3, A, B.
Antithamnion americanum (Harv.) Farl. 1 (but see 4), A.
Antithamnion cruciatum (C. Ag.) Näg. 2, 3, 4, A, B.

Other sterile material was collected by Mrs. Abbott, 30-VII-'47, on both *Zostera* and *Chondrus*.

Antithamnion Plumula (Ellis) Thur. 1, 20.
Asparagopsis hamifera (Har.) Okam. 4, A, B.

Found in abundance in early July and in much less abundance in August (7119, cystocarpic).

Bangia fuscopurpurea (Dillw.) Lyngb. 1, A, B.

In places on *Fucus* and with *Blidingia minima* (7159) and forming slick felty coatings on high-tide rocks. This latter material (7018, sterile) was a uniseriate thick-elastic-walled form. During the month of July small forms were collected on *Chondrus* that were seen to have short rhizoids from the lowermost three to four cells only after the fashion of *B. ciliaris* Carm. as illustrated by Taylor (8).

Callithamnion americanum 1 = Antithamnion americanum (Harv.) Farl.
Callithamnion Baileyi Harv. 1, 4, A, B.

Growing in truncated stubby tufts on *Corallina* on the exposed sides of the offshore rocks at the north end of the island (7209, tetrasporic).

Callithamnion Borreri 1 = Pleonosporium Borreri (J. E. Smith) Näg.
Callithamnion byssoideum Arn. 1, A, B 7179.

One collection (7179) washed in bearing an abundance of procarps.

CALLITHAMNION CORYMBOSUM (J. E. Smith) C. Ag. 1, 3, 4, A, B.
Callithamnion Daviesii 1 = ACROCHAETIUM DAVIESII (Dillw.) Näg.
Callithamnion luxurians 1 = CHROMASTRUM VIRGATULUM (Harv.) Pap.
Callithamnion plumula 1, 20 = ANTITHAMNION PLUMULA (Ellis) Thur.
CALLITHAMNION ROSEUM (Roth) Harv. 4, A, B 7174.
Callithamnion seirospermum 1 = SEIROSPORA GRIFFITHSIANA Harv.
Callithamnion Turneri 1 = SPERMOTHAMNION TURNERI (Mert.) Aresch.
Ceramium arachnoideum 1 = C. FASTIGIATUM Harv., or C. RUBRUM (Huds.) C. Ag. (4).
CERAMIUM DIAPHANUM (Lightf.) Roth. 1 (but see 4), A, B.

The material found (*e. g.* 7160, 7182) was adrift and sterile. Lewis & Taylor (4) say all the Jordan herbarium material investigated was *C. fastigiatum* Harv.

CERAMIUM FASTIGIATUM Harv. 1, 3, 4, A, B.

Washed in all around the island (7018, 7177, tetrasporic) and on the bottom below low tide level (7180).

CERAMIUM RUBRUM (Huds.) C. Ag. 1, 2, 3, 4, A, B 7183.

Many of the ambiguous forms of this species were observed and collected; of these a particularly proliferous cystocarpic specimen (7181) and one cystocarpic covered with crustose corallines (7018), might be specifically mentioned as unusual.

CERAMIUM STRICTUM (Kütz.) Grev. & Harv. 3, A.
Ceramium tenuissimum authors = C. FASTIGIATUM Harv.
CHAMPIA PARVULA (C. Ag.) Harv. 1, 2, 3, A, B 7162.
CHONDRIA BAILEYANA (Mont.) Harv. 3, 4, A, B.

Tetrasporic (7121) just below *Fucus vesiculosus* in large hemispherical clumps.

CHONDRIA SEDIFOLIA Harv. A, B 7135, 7141.
CHONDRIA TENUISSIMA (Good. & Wood.) C. Ag. A, B 7192.
Chondria tenuissima var. *Baileyana* 3 = CHONDRIA BAILEYANA (Mont.) Harv.
Chondriopsis tenuissima authors = CHONDRIA TENUISSIMA (Good. & Wood.) C. Ag.
CHONDRUS CRISPUS (L.) Stack. 1, 2, 3, A, B.
CHOREOCOLAX POLYSIPHONIAE Reinsch. 3.

Chromastrum virgatulum (Harv.) Pap. (16). 1, 3.
Corallina officinalis L. 1, 2, 3, A, B.
Cytoclonium purpurascens 1, 3 = C. purpureum (Huds.) Batt.
Cystoclonium purpurascens var. *cirrhosa* 3 = C. purpureum var. cirrhosum Harv.
Cystoclonium purpurascens var. *stellata* 3 = C. purpureum (Huds.) Batt.
Cystoclonium purpureum (Huds.) Batt. 1, 3, A, B 7011, 7190.
Cystoclonium purpureum var. cirrhosum Harv. *apud* Taylor (8). 2, 3, A, B 7018.
Dasya elegans 1 = D. pedicellata C. Ag.
Dasya pedicellata C. Ag. 1, A, B 7017, 7178.
Delesseria sinuosa 1, 2, 3 = Phycodrys rubens (Huds.) Batt.
Dumontia filiformis 6 = D. incrassata (Müll.) Lam.
Dumontia incrassata (Müll.) Lam. 6, A.
Erythrotrichia carnea (Dillw.) J. Ag. 6, A.
Erythrotrichia ceramicola 3 = E. carnea (Dillw.) J. Ag.
Erythrotrichia rhizoidea Clel. B.

On *Sphacelaria* 7196a.

Fosliella Lejolisii (Rosan.) Howe. 3, A.
Furcellaria fastigiata? 1 = Polyides rotundus (Gmel.) Grev.
Gelidium corneum 1 = Lomentaria Baileyana (Harv.) Farl. (4).
Griffithsia Bornetiana 2 = G. globulifera Harv.
Griffithsia corallina 1 = G. globulifera Harv. (4).
Griffithsia globulifera Harv. 1, 2, 4, A.
Grinnellia americana (C. Ag.) Harv. 1, 2, 3, A, B.
Hildenbrandia Prototypus Nardo. 2, 3, A, B 7277, 7013.
Kylinia compacta (Jao) Pap. (16). B.

Collected by Dr. Hannah T. Croasdale on *Ceramium strictum* (in Herb. I. A. Abbott, 1550).

Lithophyllum macrocarpum (Rosan.) Foslie. A, B.

In abundance on *Ascophyllum* but all material investigated closely was sterile.

Lithophyllum pustulatum (Lam.) Foslie. 3.
Lithothamnium Lenormandi (Aresch.) Foslie? 3.
Lithothamnion polymorphum 2 = Phymatolithon polymorphum (L.) Foslie.
Lomentaria Baileyana (Harv.) Farl. 1, 2, 4, A.
Lomentaria uncinata 2, 4 = L. Baileyana (Harv.) Farl.
Melobesia Lejolisii 3 = Fosliella Lejolisii (Rosan.) Howe.

Melobesia pustulata 3 = LITHOPHYLLUM PUSTULATUM (Lam.) Foslie.
NEMALION MULTIFIDUM (Web. et Mohr) J. Ag. 2, 3, A.
NULLIPORA POLYPHYLLAMEA? 1.
PHYCODRYS RUBENS (Huds.) Batt. 1, 2, 3, A, B.
PHYLLOPHORA BRODIAEI (Turn.) J. Ag. 1 (but see 4), 2, 3, A, B 7163.
PHYLLOPHORA MEMBRANIFOLIA (Good. et Wood.) J. Ag. 2, 3, 4, A, B 7018.
PHYMATOLITHON POLYMORPHUM (L.) Foslie. 2.
PLEONOSPORIUM BORRERI (J. E. Smith) Näg. 1.
Plumaria elegans 3 = PLUMARIA SERICEA (Harv.) Rupr.
PLUMARIA SERICEA (Harv.) Rupr. 1, 2, 3.
POLYIDES ROTUNDUS (Gmel.) Grev. 1, 2, A, B in Herb. Eliz. M. Fahey.
Polysiphonia affinis 1 = P. NOVAE-ANGLIAE Taylor.
Polysiphonia atrorubescens 4 = P. NIGRA (Huds.) Batt.
POLYSIPHONIA ELONGATA (Huds.) Harv. 1, 2, 3, A, B.
Polysiphonia fastigiata 1, 3 = P. LANOSA (L.) Tandy.
POLYSIPHONIA FIBRILLOSA Grev. 3, A, B 7018, 7185 cystocarpic.
POLYSIPHONIA FLEXICAULIS (Harv.) Coll. 3, A.
Polysiphonia formosa 1 = P. URCEOLATA (Lightf.) Grev.
POLYSIPHONIA HARVEYI Bail. 1.
POLYSIPHONIA LANOSA (L.) Tandy. 1, 3, A, B 7154.
POLYSIPHONIA NIGRA (Huds.) Batt. 4, B.
POLYSIPHONIA NIGRESCENS (Huds.) Grev. 1, 2, 3, A, B 7184.
POLYSIPHONIA NIGRESCENS var. DURKEEI Harv. 3.
POLYSIPHONIA NIGRESCENS var. FUCOIDES Harv. 3.
POLYSIPHONIA NOVAE-ANGLIAE Taylor. 1, 3, 4, A, B.
Polysiphonia Olneyi 1 = P. HARVEYI Bail.
POLYSIPHONIA SUBTILISSIMA Mont. 1.
POLYSIPHONIA URCEOLATA (Lightf.) Grev. 1, 4, A, B.

Collected by Leonard Spiegel on *Agardhiella;* while sterile, it seemed to be the variety *patens.*

Polysiphonia urceolata var. *formosa* 3 = P. URCEOLATA var. ROSEOLA (C. Ag.) J. Ag.
POLYSIPHONIA URCEOLATA var. PATENS (Dillw.) Grev. 3.
POLYSIPHONIA URCEOLATA var. ROSEOLA (C. Ag.) J. Ag. 3.
POLYSIPHONIA VARIEGATA (C. Ag.) Zan. 1, A.
Polysiphonia violacea 1, 3, 4 = P. NOVAE-ANGLIAE Taylor.
Polysiphonia violacea var. *flexicaulis* 3 = P. FLEXICAULIS (Harv.) Coll.
Porphyra laciniata 3 = P. UMBILICALIS (L.) J. Ag.
PORPHYRA UMBILICALIS (L.) J. Ag. 1, 3, A, B 7155.

With monosporangia in whitish areas scattered submargin-

ally as would be expected of the spermatangial areas of *P. leucosticta* Thur.

Porphyra vulgaris 1 C. Ag. = P. UMBILICALIS (L.) J. Ag.
Ptilota elegans 1 authors = PLUMARIA SERICEA (Harv.) Rupr.
RHODODERMIS GEORGII (Batt.) Coll. 3, A, B 7317.

Pointed out by W. R. Taylor on the leaves of *Zostera*.

RHODOMELA SUBFUSCA (Wood.) C. Ag. 1, 3.

Collected by Dr. Hannah Croasdale in wash at the south end of the island during the summer of 1946.

RHODYMENIA PALMATA (L.) Grev. 1, 3, 5, A, B.
SCINAIA FURCELLATA (Turn.) Biv. 4.
SEIROSPORA GRIFFITHSIANA Harv. 1, 3, A, B 7183, 7176.
SPERMOTHAMNION TURNERI (Mert.) Aresch. 1, 2, 3, A, B 7175.
SPYRIDIA FILAMENTOSA (Wulf.) Harv. 2, 3, A.
SPYRIDIA FILAMENTOSA var. REFRACTA Harv. 1.
TRAILLIELLA INTRICATA (J. Ag.) Batt. 4, A, B.

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II. FRESH AND BRACKISH WATER ALGAE OF PENIKESE ISLAND

Hannah Croasdale[1]

(Plate 1118)

The island of Penikese boasts only two brackish ponds and a fleeting number of freshwater ones. The former, being replenished from the sea by splash or seepage, apparently hold water throughout the summer. The others all dry up sooner or later.

South Pond. The deeper of the brackish ponds is at the southern tip of the island and is known as South Pond. It lies very near the east shore, separated from the sea only by a bar of shingle, and has practically no aquatic vegetation around it. It is approximately 200 x 70 feet. On August 3rd its salinity was 13.2, its pH 9.0, its temperature 30° C. It had a heavy scum of *Enteromorpha* and bluegreens all around the edge.

[1] Dartmouth College, Hanover, New Hampshire.

Tub Pond. The other brackish pond lies in the southwest corner of Tub Point, and is sometimes shown on maps as two ponds, although the two were merged in 1947. It is relatively shallow and, being further from the sea and on a quieter shore, probably gets little splash. It is surrounded mainly by coarse grass. When full it is about 200 x 100 feet, but it dries down somewhat during the summer. In August its salinity was 34.4, its pH 9.0–9.5, its temperature 29° C. It had a heavy scum of *Enteromorpha* and bluegreens; there was also much guano flavoring it.

Typha Pond. This lies near the east shore, but protected by high land from the sea, across from Tub Point. It is the nearest thing to a freshwater pond on the island, but it undoubtedly dries up completely most summers. When full it is about 150 feet in diameter, and has much aquatic vegetation in and around it. On July 6th it was nearly full but by August 3rd it was nearly dry. Its salinity then was 0.8, its pH 8.0–8.5, its temperature 33° C. In July about half its surface was covered with a scum of conjugates and *Oedogonium*, and there was a fine bed of *Chara*. By August the *Chara* had disappeared, the scum was rotting, and patches of blue-greens were appearing on the newly exposed bottom.

Marsh. The area known as "The Marsh" lies at the northeast end of the island, where the neck leads off to Tub Point. When wet it covers an area of about 400 x 100 feet, but it dries up drastically during the summer: in July there was standing water over most of it, by August it was all dry except for about 4 square feet. In August the salinity was 0.6, the pH 8.5, the temperature 33° C (except for one springy spot, under a board, that was 22° C.) There was a bluegreen or flagellate film over much of the exposed bottom.

Dry Pond, "Zinn Pond", Leper Pond, Tern Pond. On the west side of the island there is a series of small kettle holes which contain water during the early part of the summer. By August they were all dry. From north to south they are known as Dry Pond, "Zinn Pond", Leper Pond and Tern Pond. There was a little water in Tern Pond in July, and it showed a pH of 7.0.

Cistern. An old cistern among the ruins of the Leper Houses, containing rusty water, supported a variety of flagellates.

Reservoirs. There are two reservoirs, on the high land at the center of the island. The deeper of these was dry in July and August and showed only encysted *Sphaerella*. The shallower one had several inches of water over a thin layer of silt, tinted green with *Scenedesmus* and *Pediastrum*. The water showed a salinity of 0.6, a pH of 9.0–9.5, and a temperature of 30° C.

As may be seen the freshwater algae of Penikese are severely handicapped by having no stable freshwater environment, such as a permanent pond or stream. This factor naturally outweighs most others, and a collection made during any one visit probably reflects the past and present state of dryness of habitats rather than any geographical isolation. The only way to acquire a fair knowledge of the freshwater algal population of the island would be to stay there throughout the season, for several seasons, and take repeated samples from the transient ponds as they fill and dry.

Diatoms: In the case of the diatoms, however, because of their durable shells, a careful study of the bottom mud of a pond, however small, dried or not, might reveal what diatoms it had harbored in previous favorable periods. Such a study was made by Paul S. Conger in 1923 and indicated what the diatom flora had been during the past. Mr. Conger has pointed out that another diatom survey, after a mere 25 years, would probably only bring the same forms to light again, and serve to confuse the issue. "The possibility of invasion of a new form or forms in these ponds which might make them different from the previous examination is so remote as to suggest nothing of significance." Consequently, on his recommendation, a diatom list is omitted here but may be obtained from the 1923 survey.

Chlorophyceae: As might be expected, collections from brackish ponds and from small freshwater ones on the verge of drying up yielded a relatively poor assortment of green algae. *Oedogonium* and *Spirogyra* in one pond formed extensive mats in July but disappeared later. The most conspicuous genus was *Scenedesmus* which was present in great abundance and variety in nearly all the samples. Desmids were naturally sparse, being represented mainly by *Closterium* and *Cosmarium*.

Xanthophyceae were inconspicuous on the whole but furnished several new and interesting forms.

Myxophyceae dominated the field by August, and though no wealth of species was noted, in most collections one or more genera of the Oscillatoriaceae formed the bulk of the algal material.

Chrysophyceae[2] were disappointingly few in number considering the numbers usually found in salt and brackish water. It was hoped that *Chrysococcus*, frequently the most abundant inland water summer genus would be found; not one was seen. Two of the four genera are believed to be new records for this country, however: *Olisthodiscus luteus* Carter and *Prymnesium parvum* Carter[3]. The former had been previously observed at Woods Hole, and possibly in some of the Wisconsin lakes, but not identified.

Cryptophyceae were numerous. The five species included a red *Cryptomonas*, but this is not believed to be new. Species erection has probably been too greatly extended for this genus whose members vary a great deal, and the red form from South Pond was probably only a variant of *C. erosa*, common to four other stations. *Chroomonas baltica* is probably a new U. S. record.

Dinophyceae were extremely few, which was unexpected, because similar situations around Woods Hole frequently have an abundance of these. Chlorophycean flagellates were also sparse. *Dunaliella* was found in South Pond and *Haematococcus* developed in the laboratory in a few hours from a dried red crust. Two small organisms which might be *Chlamydomonas* or might be algal reproductive cells are shown.

Euglenophycean species were most numerous. None was particularly unexpected except possibly *Menoidium gracile*. One heavily ribbed form while abundant could not be satisfactorily placed: it has been doubtfully termed *Tropidoscyphus*.

The protozoan flagellates are the usual ubiquitous group, and in this case are rather fewer than might have been expected. A single one was found in some abundance which could not be identified at all and is not listed here.

[2] The paragraphs and tables concerning the flagellate groups of the Chrysophyceae, Cryptophyceae, Dinophyceae, Chlorophyceae and Euglenophyceae were provided by Dr. J. B. Lackey, Philadelphia, Pennsylvania, from his collections and observations while cooperating in the general survey of the Island on August 3, 1947.

[3] Carter, Nellie. New or interesting algae from brackish water. Arch. f. Protistenk. 70: 1–68. 1938.

The following lists, from collections obtained during a few hours spent on the island in July, and again in August, are not to be considered as complete. Any differences from the lists obtained in 1923 probably indicate the current collecting conditions rather than the lapse of 25 years. The flagellate collections, by Dr. Lackey, were limited to August. Despite the poor conditions a total of 88 flagellated algae and protozoa were found and identified to genus, and in 74 cases to species.

Excluding flagellates, of the 37 forms recorded in 1924 about a third were re-found in 1947, and also, about half have been found during that interval on the other Elizabeth Islands. Of the present list of 107 forms, 49 have been found on the other Elizabeth Islands, an additional 18 have been reported elsewhere in Massachusetts, 29 are believed to be new to the state, and 5 new to science.

List of Freshwater Algae (Exclusive of Flagellates and Diatoms)[4]

CHLOROPHYCEAE

**Ankistrodesmus Chodati (Tann.-Fullem.) Brunnth.—Marsh
**A. convolutus Chorda, v. minutus (Näg.) Rab.—Leper, Marsh
A. flacatus (Chorda) Ralfs—Typha
*Chara Braunii Gruel. (Det. *R. D. Wood*)—Typha
*Chlorococcum humicolum (Näg.) Rab.—Soil cultures
*Closterium juncidum Ralfs—Typha
*C. juncidum, v. brevior (Ralfs) Roy—Typha
**C. lunula (Müll.) Nitsch., v. coloratum Klebs.—Typha
*C. parvulum Näg.—Marsh, Typha
*C. Ralfsii Bréb., v. hybridum Rab.—Leper
*C. strigosum Bréb.—Leper
*C. striolatum Ehr.—Typha
**C. venus Kütz., v. incurvum (Bréb.) Krieger—Typha
*Coelastrum cambricum Arch.—Marsh
**Cosmarium granatum Bréb., f. minor Skuja—Typha
*C. impressulum Elfv.—Marsh, Typha
**C. impressulum, forma—Tern, Typha
*C. polygonum (Näg.) Arch.—Marsh, Typha (with zygospore)
*C. punctulatum Bréb., v. subpunctulatum (Nordst.) Börg.—Typha
*C. reniforme (Ralfs) Arch.—Typha

[4] Species marked with one asterisk have not been reported before from Penikese. Species marked with two asterisks are believed to be new to Massachusetts.

*C. TURPINII Bréb., v. PODOLICUM Gutw.—Typha
**ENTEROMORPHA INTESTINALIS (L.) Grev., f. TENUIS Collins—Typha
GLAUCOCYSTIS NOSTOCHINEARUM Itzigs.—Marsh
**GLOEOCYSTIS AMPLA Kütz.—Typha
**GONGROSIRA FASTIGIATA (Borzi) Schmidle—Typha
*KENTROSPHAERA FACCIOLAAE Borzi—Tern
*MICROSPORA QUADRATA Hazen—"Zinn"
M. WILLEANA Läg.—"Zinn"
*M. WITTROCKI Läg.—Typha
MICROTHAMNION KUETZINGIANUM Näg.—Typha
*OEDOGONIUM CRASSIUSCULUM Wittr., v. IDIOANDROSPORUM Nor. & Wittr.—Typha
**PALMELLA MUCOSA Kütz.—Typha
*PEDIASTRUM BORYANUM (Turp.) Menegh.—Typha
*P. TETRAS (Ehr.) Ralfs—Typha
PROTOCOCCUS VIRIDIS Ag.—Typha and Soil cultures
*PROTODERMA VIRIDE Kütz.—Typha
*SCENEDESMUS ABUNDANS (Kirchn.) Chod.—Marsh, Typha
*S. ABUNDANS, v. ASYMMETRICA (Schröd.) Smith—Marsh, Reservoir, Typha
**S. ABUNDANS, v. BREVICAUDA Smith—Marsh, Typha
*S. ABUNDANS, v. LONGICAUDA Smith—Marsh
*S. ACUTIFORMIS Schröd.—Reservoir, Typha
*S. ARCUATUS Lemm., v. CAPITATUS Smith—Reservoir
*S. BIJUGA (Turp.) Läg.—Leper
S. BRAZILIENSIS Bohlin—Reservoir
*S. DIMORPHUS (Turp.) Kütz.—Leper, Typha
**S. LONGUS Meyen—Marsh, Reservoir
*S. QUADRICAUDA (Turp.) Bréb.—Leper, Marsh, Reservoir, Typha
**S. SERRATUS (Chorda) Bohlin—Reservoir
**SPIROGYRA MAJUSCULA (Kütz.) Czurda emend—Typha
*STAURASTRUM HEXACERUM (Ehr.) Wittr.—Typha
**S. MUCRONATUM Ralfs—Typha
**S. PUNCTULATUM Bréb., v. PYGMAEUM (Bréb.) W. & G. S. West—Typha
**STIGEOCLONIUM NANUM Kütz.—Typha
*TETRAËDRON MINIMUM (A. Br.) Hansg.—Typha
*TROCHISIA RETICULARIS (Reinsch) Hansg.—Typha

XANTHOPHYCEAE

**BOTRYDIOPSIS ARHIZA Borzi—Tern
*BOTRYOCOCCUS BRAUNII Kütz.—Typha
**HETEROTHRIX QUADRATA Pascher—Soil culture
MERINGOSPHAERA HENSENI Schiller, v. **brevispina, var. nov.—Tern

*Ophiocytium cochleare A. Br.—Typha
*O. majus Näg.—Marsh
O. **undulatum, sp. nov.—Marsh
Radiosphaera **Nemiahi, sp. nov.—Marsh
**Tetraedriella acuta Pascher—Typha
Tribonema Gayanum Pascher—Tern, Typha
*T. minus Hazen—Marsh, "Zinn"

MYXOPHYCEAE

Anabaena californica Borge, f. **subconstricta, fa. nov.—Typha
**A. flos-aquae (Lyngb.) Bréb., v. gracilis Klebahn—Typha
*A. inaequalis (Kütz.) Born. et Flah.—Marsh
*Chroococcus minutus (Kütz.) Näg.—Typha
*C. turgidus (Kütz.) Näg.—Marsh
**Lyngbya Allorgei Frémy—"Zinn"
*Merismopedia tenuissima Lemm.—Typha
**Nostoc rivulare Kütz.—Marsh, Typha
**Oscillatoria acutissima Kuff.—Marsh
*O. amphibia Ag.—Marsh
*O. brevis (Kütz.) Gom.—Marsh
*O. ornata Kütz.—Marsh
*O. prolifica (Grev.) Gom.—Tern
**O. pseudogeminata G. Schmid.—Soil culture
O. tenuis Ag.—Leper, Marsh, Typha, "Zinn"
*Phormidium laminosum Gom.—"Zinn"
P. tenue (Menegh.) Gom.—Marsh
Spirulina subtilissima Kütz., v. **brevis, var. nov.—Marsh
*S. tenerrima Kütz.—Typha

List of Brackish-water Algae (Exclusive of Flagellates and Diatoms)

CHLOROPHYCEAE

Enteromorpha spp.[6]

MYXOPHYCEAE

**Anabaena torulosa (Carm.) Läg., v. cylindracea (Playf.) Geitl.—South
*Aphanothece Castagnei (Bréb.) Rab.—Tub
Lyngbya aestuarii Gom. (Det. *F. Drouet*)—Tub
*L. confervoides Ag.—South
*L. epiphytica Hieron.—South, Tub
*Microcystis flos-aquae (Wittr.) Kirchn.—Tub
**M. parasitica Kütz.—Tub

[6] The species of *Enteromorpha* have been treated with the marine forms in the preceding paper by Dr. M. S. Doty.

Oscillatoria amphibia Ag.—Tub
**O. articulata Gardn.—South
**O. geminata Menegh.—Tub
O. margaritifera Kütz.—Tub
?*O. maritima C. Ag. (Det. *F. Drouet*)—Tub
*O. nigro-viridis Thwaites—Tub
*O. tenuis Ag.—South
*Spirulina maior Kütz.—Tub
*S. subsalsa Oerst.—South

List of Flagellates from Six Habitats on Penikese Island, August 3, 1947

(All in the trophic state)

	Typha	Cistern	Salt	Reservoir	Marsh	Tub
CHRYSOPHYCEAE						
Chromulina ovalis	X	X				
Ochromonas sp.			X			
Olisthodiscus luteus			X			
Prymnesium parvum			X		X	
CRYPTOPHYCEAE						
Chroomonas (setoniensis?)	X		X		X	
Chroomonas baltica	X					
Cryptomonas erosa	X	X	X		X	X
Cyathomonas truncata				X		
Rhodomonas lens						X
DINOPHYCEAE						
Amphidinium operculatum						X
Exuviaella lima						X
Glenodinium cinctum	X					
Gymnodinium palustre			X			
Gymnodinium (punctatum or simplex)			X			
Peridinium bipes			X			
CHLOROPHYCEAE						
Chlamydomonas sp. (Fig. 1)		X				
Chlamydomonas sp. (Fig. 2)		X				
Chlamydomonas sp.	X				X	
Chlamydomonas sp.					X	

	Typha	Cistern	Salt	Reservoir	Marsh	Tub
Chlorogonium euchlorum	X				X	
Dunaliella salina			X			
Haematococcus pluvialis		X				
Eudorina elegans	X					
Heteromastix angulata			X			
Lobomonas rostrata		X				
Polytoma uvella						X
Pyramidomonas sp			X			
Thoracomonas phacotoides	X					
EUGLENOPHYCEAE						
Anisonema ovale	X		X			
Anisonema sp.				X		
Astasia Klebsii	X		X		X	
Colacium calvum	X					
Entosiphon sulcatus		X				
Euglena agilis	X					
Euglena gracilis	X		X			
Euglena fusca	X					
Euglena mutabilis	X					
Euglena pisciformis	X					
Euglena spirogyra	X					
Euglena viridis	X					
Euglena sp.			X			
Heteronema acus					X	
Lepocinclis fusiformis					X	
Lepocinclis ovum	X					
Menoidium gracile	X		X		X	
Menoidium incurvum	X				X	
Menoidium tortuosum	X				X	
Notosolenus apocamptus			X	X	X	
Notosolenus orbicularis	X		X		X	
Petalomonas carinata	X				X	
Petalomonas mediocanellata	X					
Peranema trichophorum	X		X		X	
Phacus brevicauda					X	
Phacus parvula					X	
Phacus pleuronectes	X					
Phacus pyrum	X				X	
Phacus triqueter	X				X	
Phacus longicauda					X	

	Typha	Cistern	Salt	Reservoir	Marsh	Tub
TRACHELOMONAS HISPIDA	X			X	X	
TRACHELOMONAS OBOVATA	X				X	
TRACHELOMONAS PUNCTATA					X	
TRACHELOMONAS RUGOSA				X		
TRACHELOMONAS VOLVOCINA	X					
TROPIDOSCYPHUS OCTOCOSTATUS			X			
TROPIDOSCYPHUS SP. (Fig. 3)			X			
PROTOZOA[7]						
ACTINOMONAS SP.			X			
BICOECA LACUSTRIS			X		X	X
BICOECA SP.			X			
BODO ANGUSTUS					X	
BODO CAUDATUS					X	
BODO LENS					X	
BODO MINIMUS						X
BODO RENIFORMIS			X			X
BODO SP.	X			X	X	
COPROMONAS SUBTILIS						X
DINOMONAS VORAX				X		
HEXAMITUS INFLATUS						X
MASTIGAMOEBA LONGIFILUM						X
MONAS AMOEBINA				X	X	
MONAS SP.			X			
MONOSIGA OVATA	X					
OICOMONAS TERMO	X			X	X	
OICOMONAS SOCIALIS				X		X
PLEUROMONAS JACULANS			X			
POTERIODENDRON PETIOLATUM	X					
RYNCHOBODO NASUTA			X			X
SALPINGOECA MINUTA			X			
TREPOMONAS AGILIS	X					X

DESCRIPTIONS OF NEW FORMS

COSMARIUM IMPRESSULUM Elfv. forma. (Pl. 1118, Figs. 5, 6). A form approaching *C. impressulum* f. *suborthogona* Racib. in shape and f. *minor* Turn. in size. Length 20–23 μ, breadth 14–18 μ, thickness 8–13 μ. Tern Pond, Typha Pond.

[7] **The few non-flagellate forms listed here are included merely as a matter of record and not through any belief that they may belong to one of the "algal series."**

Radiosphaera **Nemiahi**[8], sp. nov. (Pl. 1118, Fig. 8). Cellulae ellipsoideae, membranis levibus; spinae maxima ex parte aequatoriales, attenuatae, autem, pauciores brevioresque quam in *R. sol* Pascher. Cellulae intus incognitae. Cellulae 8 x 10 μ, spinae 2–5 μ long. Marsh.

Meringosphaera Henseni Schiller, v. **brevispina**, var. nov. (Pl. 1118, Fig. 7). Varietas spinas pauciores brevioresque, processibus consimiles, habens. Cellulae sine spinis 10–15 μ lat.; spinae 1–1.5 μ lat., 6–9 μ long. Tern Pond.

Ophiocytium **undulatum**, sp. nov. (Pl. 1118, Fig. 9). Cellula solitaria, brevis, non convoluta sed aequaliter undulata, c. 4 undulationibus; apex rotundatus, basis spinam brevem disco basali praeditam habens. Cellula 7 μ lat., 40 μ long. Specimen unicum visum. Marsh.

Anabaena californica Borge, f. **subconstricta**, fa. nov. (Pl. 1118, Fig. 1, 2). Forma a typo differens sporis subconstrictis asperisque et magnitudine paulo minore; cellulae vegetativae pseudovacuolas praebentes. Veg. cell. 4–4.5 x 4–6 μ, heterocyst. cell. 6 x 10 μ, sporae 5–5.5 x 12–16 μ. Typha Pond. Geitler includes this species in *A. inaequalis* (Kütz.) Born. et Flah., disregarding its tapered end cell. My form resembles so much more closely Borge's figures and description that I prefer to maintain his species.

Spirulina subtilissima Kütz., v. **brevis**, var. nov. (Pl. 1118, Fig. 3). Varietas multo brevior quam typus, extremitatibus acuminatis et spiris laxioribus. Trichomata 0.8–0.9 μ lat., 10–20 (–25) μ long., spirae 1.5–2.0 μ lat., anfractibus 3–6, inter se 3.5–4 μ distantibus. Marsh.

Explanation of Plate 1118

Anabaena californica Borge, f. **subconstricta**, fa. nov.: Fig. 1, end of filament; Fig. 2, ripe spore.
Spirulina subtilissima Kütz., v. **brevis**, var. nov.: Fig. 3.
Cosmarium impressulum Elfv., forma: Figs. 5, 6.
Meringosphaera Henseni Schiller, v. **brevispina**, var. nov.: Fig. 7.
Radiosphaera **Nemiahi**, sp. nov.: Fig. 8.
Ophiocytium **undulatum**, sp. nov.: Fig. 9.
Cosmarium polygonum (Nāg.) Arch.: Figs. 10, 11, 2 forms; Fig. 12, zygospore; Fig. 13, another zygospore at lesser magnification.
All figures except no. 13 drawn to same scale, with aid of camera lucida.

[8] Named in honor of Professor R. C. Nemiah, of Dartmouth College, who has guided the author through hundreds of Latin diagnoses.

PSEUDO-ELEPHANTOPUS SPICATUS, A WEED OF POTENTIAL IMPORTANCE IN FLORIDA

S. F. Blake

Pseudo-elephantopus spicatus (B. Juss.) Gleason, a composite originally described from French Guiana and now known as a wide-spread weedy plant of the American and Old World tropics, was first recorded from the United States by Dr. F. R. Fosberg (Amer. Midl. Nat. **29**: 786. 1943), on the basis of a specimen collected by O. E. Baynard in April 1942 in a picnic area in Hillsborough State Park, northeastern Hillsborough County, in central western peninsular Florida, and sent for identification to the Bureau of Plant Industry. It was accompanied by the note that 2 plants had been observed in 1941, and about 50 in 1942. Dr. Erdman West of the Florida Agricultural Experiment Station has now sent another specimen collected by E. B. Hadley at Bradenton, Manatee County, the next county south of Hillsborough County, on 27 January 1947. The finder stated that it is a pestiferous weed in cultivated fields, and is not relished by cattle. Apparently it is getting well established in western peninsular Florida.

The plant has usually been known as *Elephantopus spicatus* Juss. or *Distreptus spicatus* Cass. In 1902 C. F. Baker, in his revision of the Elephantopeae (Trans. Acad. Sci. St. Louis **12**: 54) adopted for the genus the older name *Pseudelephantopus* of Rohr, and he has been followed by most recent authors, including Gleason in his treatment in the North American Flora. W. R. Philipson, who upholds the genus as distinct from *Elephantopus*, has recently stated (Journ. Bot. **76**: 301. 1938) that the original spelling of the name was *Pseudo-Elephantopus*. Not having access to the original publication by Rohr[1], I have followed him except for decapitalizing the second component of the name. Philipson also states that the name *Pseudelephantopus spicatus*,

[1] Since this paper was put in type, I have been able to examine Rohr's original publication of the name *Pseudo-Elephantopus* and corroborate Philipson's statements regarding it. Each of the half dozen references to Rohr's paper that I have examined differs in details from each of the others, and each, including Philipson's, is incorrect or incomplete in at least one particular. The correct citation is: *Pseudo-Elephantopus* Rohr, Skrivter af Naturhistorie-Selskabet (Kiøbenhavn) **2** (1): 214. 1792. Vol. 2 was published in two separately paged hefter, so that it is necessary to cite the part in which the name appeared; de Candolle and Pfeiffer, the only authors who indicate the part, wrongly give it as part 2.

cited by Gleason (North Amer. Fl. **33:** 109. 1922) as published by Rohr in 1792, was actually first printed in the North American Flora, and should be ascribed to Gleason. The name *Elephantopus spicatus*, when first published by Aublet (Hist. Pl. Guiane Franç. **2:** 808. 1775), was ascribed to B. de Jussieu. No diagnosis was given, only a reference to Sloane's History and Catalogue, in the first of which a sufficient description is given to establish the name.

Pseudo-elephantopus spicatus is a simple or branching perennial herb up to about 1 meter high, thinly erect-pilose, with alternate, sessile, linear to oblong or obovate, serrulate or entire leaves, and slender usually elongate terminal spikes of white or whitish, 4-flowered, subcylindric, sessile heads, solitary or usually in small clusters in the axils of reduced leaves or bracts. The genus, which is monotypic, is related to *Elephantopus*, but differs remarkably in its pappus, which is unique in the whole family. It is described by Gleason as consisting of 10–15 bristles, including 2 long stout lateral ones plicate at the tip, 2 straight ones almost as long, and several short scarious bristles, all gradually dilated and fimbriate-ciliate at base. Although about 10 to 15 elements can be made out in the pappus, the shorter ones are mostly only incompletely separated bristles formed by the laceration of the dilated paleaceous bases of the longer ones, and the pappus seems to me better described as follows: Pappus 1-seriate, of about 5–7 bristles or awns; the 1–3 on outer side of achene (rarely wanting) usually about half as long as the others, slender, hispidulous, straight or sometimes irregularly once plicate toward apex, narrowly paleaceous-dilated and hairy at base and there sometimes lacerate into 1 or 2 much shorter bristles; the 2 (rarely 3) on the inner side of achene almost setiform, about as long as the straight part of the lateral awns, straight, hispidulous throughout, paleaceous-dilated at base and there cleft into one to several bristly or paleaceous segments on each side; the 2 on the angles stouter, very stiff, at base paleaceous and cleft like the inner awns (rarely uncleft and merely hispidulous), minutely hispidulous below, smooth and terete above, abruptly twice plicate toward apex, the extreme tip minutely hispidulous.

Mr. Hadley's statement regarding the weedy nature of this

plant in Florida is of interest because of what is known of its behavior in other regions where it has become introduced. Of special significance is a note published by Auguste Chevalier, the well-known writer on African plants and on tropical plants in general, under the title "Sur une mauvaise herbe de Tahiti" (Revue Bot. Appl. et Agr. Trop. **11:** 119–120. 1931). In that island it bears the French names "faux-tabac" and "faux-tabac des Marquises." Introduced not long ago, it tends to spread along roads and in fallow land, and is as harmful to cultivation as lantana or guava trees. In certain valleys near Papeete it forms a thick carpet which kills all grass. Its destruction, according to an article by a local agriculturist cited by Chevalier, is difficult because it has to be dug out; the hooked awns of the pappus adhere to clothing and the hair of animals and enable it to spread everywhere. According to an inhabitant of the Marquesas, the plant was imported from America as a forage plant and is said to afford good pasturage there, but in Tahiti animals do not feed upon it. I have found no other reference to support the statement that it is a good forage plant in tropical America.

Setchell, in his paper on Tahitian spermatophytes (Univ. Calif. Publ. Bot. **12:** 212. 1926), recorded *Elephantopus mollis* H. B. K. as abundant by waysides and in fields in the District of Faaa. He stated that it was a weed of recent introduction, much disliked by the people of Tahiti, who call it "false tobacco"; the native Tahitians call it "'ava'ava" and "'ava'a," with the same significance. Chevalier questioned whether he might not have mistaken *P. spicatus* for *E. mollis*. That Setchell did not make this very unlikely misidentification is proved by an achene of *Setchell & Parkes* 43, the collection cited by Setchell, kindly sent me by Miss Annetta M. Carter, which is definitely that of *Elephantopus mollis*. Dr. F. Raymond Fosberg, who has collected in Tahiti, informs me that both *E. mollis* and *P. spicatus* are common and bad weeds in that island, where both are called by a name or names essentially identical with those reported by Setchell. He regards *E. mollis*, which has broader leaves and grows rampantly to a height of 5 or 6 feet, as the more troublesome weed of the two.

In Guam, Safford (Contr. U. S. Nat. Herb. **9:** 268. 1905) speaks of it, under the name *Elephantopus spicatus*, as a common

and troublesome weed, and states that it was collected in the island by Chamisso, who was there in 1817. Merrill (Enum. Philipp. Flow. Plants **3:** 596. 1923) gives it as common in waste places in the settled area of the Philippines, but says nothing about its weedy qualities. Grisebach (Fl. Brit. W. Ind. 355. 1861) long ago mentioned it as a troublesome weed in Jamaica. Spencer Moore, in Fawcett and Rendle's Flora of Jamaica (**7:** 166. 1936) does not refer to it as a weed, but quotes Sloane (1707) to the effect that the hard stalks and leaves were used as brooms to sweep houses.

In Java, Backer (Onkruidflora der Javasche suikerrietgronden, p. 755. 193?) states that it was first observed in 1917 in a shady kampong at Bidara tjina, just south of Meester Cornelis (near Batavia), where it was already well established, thereafter spreading to Buitenzorg (1919) and Pasoeroean (1925), thriving at both places and spreading spontaneously but at first slowly.

All the available evidence indicates that *Pseudo-elephantopus spicatus*, however interesting as an addition to the adventive flora of the United States, is a potentially injurious weed which should be extirpated if possible before it becomes too thoroughly established.

Division of Plant Exploration and Introduction
Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Maryland

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Floerkea proserpinacoides in Nova Scotia.—*Floerkea proserpinacoides*, new to the flora of Nova Scotia, was found on May 29, 1948, at Coldbrook, Kings County. The plants were growing in profusion on the wet river-meadow at the foot of a high bank close above the road-bridge, and about half a mile west of Coldbrook station. Although showing no signs of recent arrival, the species may well be of foreign origin. The material was mostly flowering, a few young fruits being seen. By the end of June the fruiting condition was predominant. The collection substantiating this report is *Erskine & Schofield* no. 2, sheets of which have been deposited at the Acadia and Gray Herbaria.

The northeastern range-limit of this species is given as being

from "w. Que. to Del." by Gray's Manual, while its easterly limit in Canada is the single station in Quebec (see Rouleau in Rhodora **47:** 272. 1945). It may be noted that Quebec is included in the range of this species by Gray's Manual, but omitted by Victorin from his Flore Laurentienne. Victorin apparently overlooked the old specimen preserved at McGill University and the record of the station on Nun's Island, near Montreal, only casually mentioned by Rouleau, for the plant has been known from there for a century and a quarter. It was found there by Dr. Andrew Holmes, his collection "made in the neighborhood of Montreal as early as 1821" (Macoun, Cat. Can. Pl. i. pp. v, vi and 91). *Floerkea proserpinacoides* represents a family, the Limnanthaceae, not hitherto found in the Maritime Provinces.—David Erskine and Wilfred Schofield, Acadia University, Wolfville, N. S.

Scirpus **verecundus,** nom. nov. *S. planifolius* Muhl. Descr. Gram. 32 (1817), not *S. planifolius* Grimm in Nov. Act. Nat. Cur. iii. (1767) App. 259.

Unfortunately Grimm's *Scirpus planifolius* has not found its way into Index Kewensis, so that its priority over Muhlenberg's name for a wholly different species has been overlooked by students of the genus in this country. Attention to the matter, with the clear statement that *S. planifolius* Muhl. is a much later homonym, was published in 1939 by Mansfeld in Fedde, Repert. Spec. Nov. xlvii. 270 (1939). Mansfeld identified *S. planifolius* Grimm with *S. compressus* (L.) Pers. (1805) not Moench (1794) and called it *S. distichus* Peterm. (1844); and Hylander, in his Nomenkl. und Systemat. Studien Nordisch. Gefässpfl. 92 (1945) [Uppsala Universitets Årsskrift 1945: 7: 92] takes up *S. planifolius* Grimm to replace *S. compressus* (L.) Pers. The name, which was published by Grimm in 1767, with proper citations of earlier descriptions of Haller and Ruppius, cannot be used for the wholly different plant described by Muhlenberg.—M. L. Fernald.

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THE FLORA OF PENIKESE, SEVENTY-FOUR YEARS AFTER

III. PENIKESE ISLAND FUNGI[1]

ELIZABETH R. DEARDEN[2]

The island of Penikese is dominated largely by an open, wind-swept, and arid grassland. To obtain a representative list of the fungous flora, several areas on the island were selected for intensive survey. These were chosen to include the habitats most nearly optimum for fungal growth, and the widest selection of possible hosts and other substrata. The results of such a localized study are likely to be more profitable than a cursory examination of the whole island necessarily limited by the time available.

A large proportion of the collections were obtained from the area encompassing Typha Pond, a shallow freshwater pond. Several Pyrenomycetes and resupinate Thelephoraceae were found on the rotted wood of decorticated willow stumps. These stumps were the only trace of willows reported around the pond by Shaw in the previous survey. The branches and dead twigs of the maple trees growing on the slopes behind the caretaker's cottage, the undersurface of fallen logs in moist areas, and the flora growing in the vicinity of the beach and pond were among the best substrates. Few fungi were collected on the herbaceous

[1] The third paper reporting results of the biological survey of Penikese Island in commemoration of the 75th anniversary of the founding of Louis Agassiz' Natural History school there in 1872.

[2] Department of Botany, University of Toronto, Toronto, Canada.

hosts growing in very dry soil. The fungi reported from soil and on dung, and the majority of the myxothallophytes listed were collected and subsequently determined by Dr. J. T. Bonner.

The fungi collected have been deposited in the Mycological Herbarium of the University of Toronto. Most of these collections are meager; few fungi are represented from more than one locality on the island. These factors indicated the season not to be at an optimum for fungal growth.

Thirty-five genera of fungi and five genera of other simple, non-pigmented thallophytes are reported for this survey. Thirty genera of fungi and all of the myxothallophytes are newly reported for Penikese. The apparent discrepancy between the present list and that compiled for the previous survey is not surprising. Both lists are admittedly incomplete, but offer some indication of the fungous vegetation to be found on the island.

To all of those who have been of assistance in the collection and determination of these fungi, particularly Dr. John T. Bonner, Mr. Zelman Z. Dworkin, Dr. Roy F. Cain, and Mr. Wm. Irwin Illman, are extended sincere thanks in acknowledgment and appreciation of their aid.

MYXOBACTERIALES

MYXOCOCCUS sp. On (?) Muskrat dung.

ACRASIALES

DICTYOSTELIUM MUCOROIDES Bref. From soil and mud, and at edge of Typha-Pond in cattails.

LABYRINTHULALES

LABYRINTHULA MACROCYSTIS Cienk. On *Zostera marina* L., widespread, causal organism of epiphytotic in eel-grass.

MYXOGASTRALES

ARCYRIA NUTANS (Bull.) Grev. On log by side of house.

DICTYDIUM CANCELLATUM (Batsch) Macbr. On log by edge of Typha Pond.

FUNGI

PHYCOMYCETES

ALBUGO CANDIDA (Pers. ex Lév.) O. Kuntze. On *Sisymbrium officinale* (L.) Scop. growing in the damp bottom of reservoir no. 2.

MUCOR sp. From soil, widespread.

PILOBOLUS sp. On (?) Muskrat dung.
RHIZOPUS sp. From soil, widespread.

ASCOMYCETES

AMPHISPHAERIA AQUATICA E. and E. On the inner rotted heartwood of *Salix* stump by Typha Pond.

HYSTEROGRAPHIUM MORI (Schw.) Rehm. On *Salix* stump by Typha Pond,

HYSTEROGRAPHIUM sp. On (?) *Catalpa* twigs. This specimen is similar to the one listed above, but has larger spores (23 x 10 μ) with lighter colored walls.

MYCOSPHAERELLA sp. On the overwintered leaves of *Panicum virgatum* L. An undetermined species of *Hendersonia* was present on the leaves of the same plant.

NITSCHKIA FUCKELII Nits. On dead twigs of *Acer*.

ORBILIA CURVATISPORA Bourd. On frondose wood by shack and at Typha Pond.

ORBILIA sp. Too young for specific determination.

ROSELLINIA SUBICULATA (Schw.) Sacc. On *Salix* stump by Typha Pond.

BASIDIOMYCETES

CONIPHORA OLIVASCENS (B. & C.) Mass. On undersurface of fallen log.

CORTICIUM CONFLUENS Fr. On stump by Typha Pond.

ODONTIA SPATHULATA (Fr.) Litsch. On frondose log by shack.

PELLICULARIA PRUINATA (Bres.) Rogers ex Linder. On wood.

PENIOPHORA CINEREA (Pers. ex Fr.) Cooke complex. On *Acer* twigs.

PENIOPHORA SAMBUCI (Pers.) Burt. On *Salix* stump by Typha Pond.

PENIOPHORA TENUIS (Pat.) Massee. From fence pole on hillside.

POLYPORUS sp. On frondose wood, too old for determination.

PORIA sp. (brown) or resupinate FOMES sp. On undersurface of log by shack.

PORIA sp. (white). On frondose wood next to shack.

PSALLIOTA ARVENSIS (?). In grass.

PUCCINIA CORONATA Corda or *P. rubigo-vera agropyri* (Eriks.) Arth. II on *Holcus lanatus*.

STEREUM FASCIATUM Schw. On frondose log by shed.

FUNGI IMPERFECTI

ASPERGILLUS CANDIDUS Link. On animal cartilage, probably porpoise.

ASPERGILLUS sp. In soil, widespread.

CEPHALOSPORIUM sp. On log next shack.

FUSARIUM sp. In soil, widespread.

HENDERSONIA sp. On leaves of *Panicum virgatum* L. A species of *Mycosphaerella* was also on this plant.

HYPOXYLON RUBIGINOSUM Fr., imperfect stage. On log of frondose wood next to shack.

OIDIUM CANDICANS (Sacc.) Linder. Imperfect stage of *Pellicularia pruinata* (Bres.) Rogers ex Linder. On the log next shack.

PENICILLIUM sp. In soil, widespread.

STEGANOSPORIUM PIRIFORME (Hoffm.) Corda. On *Acer*.

TRICHODERMA LIGNORUM (Tode) Harz. On decorticated *Salix* stump by Typha-Pond.

TUBERCULARIA sp. The imperfect stage of *Nectria cinnabarina* (Tode ex Fr.) Fr. On dead twigs of *Acer*.

TUBERCULARIA. Periola complex. On *Plantago lanceolata*.

IV. FLORA OF PENIKESE ISLAND

EDWIN T. MOUL

The third survey of the land flora of Penikese Island was made during the summer of 1947, commemorating the 74th Anniversary of the founding of the Anderson School of Natural History by Louis Agassiz. This survey was made by a group from the Botany Department of the Marine Biological Laboratory. Those participating were Gladys Bulmer, Dorothy Stewart, Hazel L. Moul, David Erskine, E. M. Hulburt and Edwin T. Moul. It was our task to cover the Lichens, Bryophytes, Pteridophytes and Spermatophytes. A total of three trips was made to the island, the first on July 6, another on July 31 and a final trip on August 3. This enabled us to secure the forms that mature early in the summer as well as collect the late summer plants.

Specimens were collected of all species observed and are to be distributed to the following Herbaria. The first set of plants will be deposited in the Woods Hole Herbarium, the second set sent to the University of California at Berkeley, the third set to the University of Pennsylvania and further duplicates to Pennsylvania State College. A complete set of grasses has been placed at Iowa State College and a set of the lichens deposited in the herbarium of the University of Wisconsin. All determinations not otherwise credited were made by David Erskine and

Edwin T. Moul. Acknowledgment is given here to Dr. John Thomson, Jr., University of Wisconsin; Dr. Richard W. Pohl, Iowa State College; Dr. E. T. Wherry, University of Pennsylvania; Dr. Herbert A. Wahl, Pennsylvania State College; Dr. F. W. Pennell of the Academy of Natural Sciences of Philadelphia and Mr. Truman Yuncker for making and verifying determinations in specific groups. The assistance of Mr. Robert L. Schaeffer, Jr., of the University of Pennsylvania in checking synonymy is gratefully acknowledged.

The first survey of the Flora of Penikese Island was made by David Starr Jordan under the direction of Louis Agassiz in 1873. The results were published in the American Naturalist, volume 8, April, 1874. A second survey was made on the 50th anniversary of the opening of the "Agassiz Laboratory" in 1923 and the results published in RHODORA, volume 26, beginning with the October issue, 1924. Dr. John M. Fogg, Jr., made an intensive study of the Flora of the Elizabeth Islands including Penikese Island, which was published in RHODORA, volume 32 beginning in the July issue, 1930.

Using these last surveys as a basis for comparison, ecologically the island has changed very little in the last twenty-five years. The plants constituting the Tension Line community growing between the bare beaches and the grasslands are fundamentally the same. For some unaccountable reason *Arenaria peploides* was not found after a thorough search. *Spergularia marina* was either overlooked or it too has disappeared from the island.

The grassland communities and the regions of the island they covered are unchanged as to dominant species. The asters recorded as occurring in the grasslands are missing or were overlooked because of their late summer flowering. Many of the cultivated "escapes" recorded in the last surveys have not survived. The disappearance of these and some other elements in the flora may be due to the severe drenching by salt spray in the two hurricanes that have visited this part of the New England coast in recent years. The damage done to the beech forest on neighboring Naushon Island attests to the violence of these storms.

It will be noticed that *Rhus radicans* has made its appearance in the grasslands and occurs in a number of places, but the plants

are small and stunted. The thickets of *Sambucus canadensis* have increased in size and number, particularly along the stone walls and in the depressions characteristic of glacial moraines. These depressions are filled with weedy and shrubby growth to the exclusion of the grasses. Trees and shrubs in the more exposed habitats have increased neither in number nor in size. This is apparent from the dead branches and twigs found at their tops.

The tern nesting areas on the northern slopes of the island reported in 1923 as denuded are now completely covered with a pure stand of *Rumex Acetosella*. The bird nesting sites are now scattered all over the grasslands and thus new areas are being constantly denuded. After abandonment they are first covered by a few lichens and the moss *Ceratodon purpureus*, followed by *Rumex Acetosella* and stunted *Oxalis stricta*.

Lichens occur on the scattered boulders, stone walls, rotten wood and bare soil all through the grasslands.

In the published record of the 1923 survey, the lichens were not included, but subsequently in "Notes from the Woods Hole Laboratory, 1932", Lewis and Taylor, Rhodora 35: 149–150, a list of ten lichens collected during the survey was published. In the present paper, eleven species and forms new to the island are reported, while six species collected in 1923 were not found.

The number of species of Bryophytes is reduced but among those collected there are two new records for the island.

The flora in and around the ponds has altered very little. Typha Pond has the richest and most diversified flora of the fresh water ponds. The willows that grew there have been cut and are dead. Dry Pond lived up to its name, although there was evidence of some water being present early in the year. Leper and Tern Ponds had become a mass of bare black mud by July 6th and had dried enough by the latter part of the month to enable a person to walk across them without sinking into the muck. They were surrounded by a rank growth of *Polygonum punctatum* and *Rumex maritimus*. The *Polygonum* was heavily parasitized by *Cuscuta polygonorum*. The bare mud surface had a scattered growth of very small but mature plants of *Myriophyllum pinnatum*. South Pond and Tub Point Pond were brackish with characteristic halophiles bordering them. *Ruppia*

maritima was collected in South Pond but had been reported by Dr. Jordan. The marshy area near the neck on the east shore of the main island almost duplicates the flora of Typha Pond. The bottom of the reservoirs have become filled with accumulated debris and humus which supports a rich growth of plants with *Juncus bufonius*, *Cerastium vulgatum* and *Bidens connata* as dominants.

A survey of the flora of near-by Gull Island was made in 1923, but because of government restrictions this island was not visited. It has been used as a target for bombing practice in the last few years.

The general aspect of the flora of the island has remained fundamentally the same in the last twenty-four years. There is a group of basic species that seem ecologically fitted to the peculiar environment of this windswept glacial moraine. Other species colonize for a time but some unusual conditions wipe them out. Now and again a colonist persists and thus over a long span of years the flora may change and the original climax of forest mentioned by Dr. Jordan may return. The botanists of the future should certainly watch and record the changes that may occur. On the other hand, the present aspect of the flora may be the new climax and not be replaced.

Below is a comparative summary of the results of the previous surveys.

	1873	1923	1930	1947
Species and forms of lichens	—	10	—	15
Species of Bryophytes	2	12	—	7
Species of Pteridophytes	1	3	3	2
Species of Spermatophytes	113	163	202	158
Total species	116	188	205	182
New records (Vascular plants)	—	94	28	29
Species missing from former surveys	—	44	22	83

Species new to the island since the 1930 report are starred.

LICHENS

(Determinations made by Dr. John Thomson, Botany Department, University of Wisconsin.)

*Cladonia chlorophaea (Flk.) Spreng., f. simplex (Hoffm.) Arn. Bare ground in grassland.

*C. CRISTATELLA Tuck. (Not referable to any named form.) Rotten wood in reservoir.
*C. CRISTATELLA Tuck., f. SQUAMOSISSIMA Robbins. Rotten wood along stone wall.
*C. CRISTATELLA Tuck., f. ABBREVIATA Merrill. Rotten wood along stone wall.
C. FURCATA (Huds.) Schrad. Bare soil in grassland.
*C. FURCATA (Huds.) Schrad., var. PALAMAEA (Ach.) Vainio, f. SUBULATA (Ach.) Vainio. Bare soil in grassland.
*C. NEMOXYNA (Ach.) Nyl. On rocks, west slope.
*C. PIEDMONTENSIS Merrill. Bare ground in grassland.
*C. SUBCARIOSA Nyl., f. EPIPHYLLA Robbins. Bare soil in grassland.
*C. SUBCARIOSA Nyl., f. EVOLUTA Vainio. Bare soil in grassland.
*LECANORA VARIA (Hoffm.) Ach. Rotten wood along stone wall.
PARMELIA CAPERATA (L.) Ach. On rotten wood along stone wall. Also rocks near East cottage.
P. SULCATA Tayl. Bare rocks, north of East Cottage. Bare soil in grassland, Tern nesting areas.
*PHYSCIA MILLEGRANA Degel. Rocks on eastern slope. Grassland.
XANTHORIA PARIETINA (L.) T. Fr. Rocks in wharf area. Also rocks in grassland, west slope of island.

BRYOPHYTES

*AMBLYSTEGIUM SERPENS (Hedw.) Bry. Eur. In shallow reservoir, on rotting wood.
BRYUM ARGENTEUM (L.) Hedw. Bare spots in grassland. Not common.
CERATODON PURPUREUS (Hedw.) Brid. Common all over the island, on bare ground and at base of boulders.
*POGONATUM PENSILVANICUM (Hedw.) Paris. One collection, beside rock on bare soil north of East cottage.
POLYTRICHUM COMMUNE Hedw. Road bank in grassland, north of East cottage.
P. JUNIPERINUM Hedw. Beside boulder, in grassland. Bare soil.
P. PILIFERUM Hedw. Several places on bare areas in grassland. Growing with Ceratodon in one collection.

PTERIDOPHYTES

(Determinations verified by Dr. E. T. WHERRY, University of Pennsylvania.)
DENNSTAEDTIA PUNCTILOBULA (Michx.) Moore. Grassy hillside, n. w. of the reservoir.
DRYOPTERIS THELYPTERIS (L.) Gray, var. PUBESCENS (Lawson) Nakai.

(*Aspidium Thelypteris* (L.) Sw.). Tern Pond. No longer at Typha and Tub Ponds.

SPERMATOPHYTES

Pinaceae

Pinus sylvestris L. In a depression along the east shore, s. w. of the cottage. The tops badly damaged and killed by the hurricanes.

Typhaceae

Typha latifolia L. Typha Pond. No longer found at South Pond.

Najadaceae

Ruppia maritima L., var. (immature). In South Pond.
Zostera marina L. Harbor in shallow water. Apparently recovering after the epidemic, but not common.

Gramineae

(Determinations made by Dr. Richard W. Pohl of Iowa State College.)
Agropyron repens (L.) Beauv. Common in grassland on Tub Point.
Agrostis stolonifera L. Grasslands, everywhere.
A. tenuis Sibth. (*A. capillaris* L.). Common, grasslands and tension line between beach and grasslands.
Ammophila breviligulata Fernald. West slope of main island and Tub Point, elsewhere along the beaches.
*Andropogon scoparius Michx. In shelter of stone wall, n. of the cottage on east shore.
Anthoxanthum odoratum L. Common grass all over the island.
Avena sativa L. Beach at s. w. corner of the main island. Rare.
*Bromus commutatus Schrad. Grassland around the cottage on the east shore.
Dactylis glomerata L. Grassland, chiefly on east shore and the neck.
Danthonia spicata (L.) Beauv. Grassland.
Elymus virginicus L. Grassland near wharf, east shore.
Festuca ovina L. Grassland and tension line.
F. rubra L. Grassland and tension line. Also the muddy bottom of the old reservoir.
Holcus lanatus L. General everywhere.
Panicum implicatum Scribn. Sandy soil, tension line between grass and beach.
P. oricola H. & C. Sandy soil, tension line.

P. VIRGATUM L. Large clumps in grassland around Typha Pond.

*PASPALUM CILIATIFOLIUM Michx. var. MUHLENBERGII (Nash) Fernald. Grassland, east slope near the wharf.

PHLEUM PRATENSE L. Scattered throughout the grassland. Not common.

POA PRATENSIS L. Common throughout grassland.

SPARTINA ALTERNIFLORA Lois., var. PILOSA (Merrill) Fernald. Common, Tub Point.

S. PATENS (Ait.) Muhl. Dense pure stand in marshy ground, east of Tub Point.

CYPERACEAE

(Determinations checked by Dr. HERBERT WAHL, Pennsylvania State College.)

CAREX LONGII Mackenzie. (*C. albolutescens* Schwein.). Commonest species. Grassland and tension line.

*C. MUHLENBERGII Schk. Rare. Grassland, east of central ridge.

C. SILICEA Olney. Sandy soil between beach and grassland. Not common.

C. SPICATA Hudson. (*C. muricata* L.). Grasslands generally.

CYPERUS FILICULMIS Vahl, var. MACILENTUS Fern. Bare hilltop, grassland north of Typha Pond.

*ELEOCHARIS PARVULA (R. & S.) Link. Muddy border of South Pond.

E. SMALLII Britton. (*E. palustris* (L.) R. & S.). Marshy margin of Typha Pond.

*E. HALOPHILA Fern. & Brack. South Pond.

SCIRPUS AMERICANUS Pers. Typha Pond and South Pond and marshy area near the Neck.

S. PALUDOSUS A. Nelson, var. ATLANTICUS Fern. Marshy area near the Neck.

S. VALIDUS Vahl. Marshy area near the Neck and Typha Pond.

JUNCACEAE

JUNCUS ACUMINATUS Michx. Typha and Leper Ponds.

*J. BUFONIUS L. South Pond and bottom of reservoir.

*J. DICHOTOMUS Ell. Grassland, west of the reservoir.

J. EFFUSUS L., var. COSTULATUS Fernald. Tern Pond.

J. GERARDI Loisel. South Pond and marshy area at the Neck.

J. TENUIS Willd. Tub and Leper Ponds and tension line between beach and grass.

LILIACEAE

ASPARAGUS OFFICINALIS L. Depressions in grasslands, throughout the main island.

Iridaceae

*Iris germanica L. Beside East cottage.
I. versicolor L. Tern and South Ponds.
Sisyrinchium angustifolium Mill. Tub Pond and grassy area near East cottage.

Salicaceae

Populus alba L. Scattered thickets on the east slope, southwest of East cottage.
P. deltoides Marsh. Near the east coast, south of the wharf. Suckers from the base of the dead shrub.
Salix alba × fragilis. Leper Pond, west shore. (Only the stumps left of former growth around Typha Pond.)
S. pentandra L. Near old foundations, west shore. (No longer at Typha Pond.)

Myricaceae

Myrica caroliniensis Mill. Small clump, grassland near the old foundations on the west shore.

Fagaceae

Quercus rubra L. Grassy hillside west of East cottage.

Urticaceae

*Morus alba L. Seven clumps on the top of the hill, Tub Point. Evidence of these plants having been killed back the previous year.

Polygonaceae

Polygonum punctatum Ell. (*P. acre* HBK.). Common in all wet areas. Typha, South, Dry, Leper and Tern Ponds and the marshy area near the Neck.
*Rheum Rhaponticum L. In the formerly cultivated area. Cottage on the East slope.
Rumex Acetosella L. Common in formerly denuded areas in grasslands. Everywhere.
R. crispus L. Common in grasslands and at Typha and Leper Ponds.
R. maritimus L., var. fueginus (Phil.) Dusen. Margin of South and Tern Ponds and the marshy area near the Neck.

Chenopodiaceae

Atriplex patula L., var. hastata (L.) Gray (*A. hastata* L.). Beach areas, both sandy and cobble.
*Bassia hirsuta (L.) Asch. At South and Tub Ponds. Marshy area.

Chenopodium album L. Tension line between grasslands and beach. Common.
Salsola Kali L. Rare. Tension line between grass and beach.

Phytolaccaceae

*Phytolacca americana L. Rather common in grasslands in protected places, along walls, in depressions and in the old foundations.

Aizoaceae

Mollugo verticillata L. Tension line in sandy soil. On the Neck.

Caryophyllaceae

Cerastium vulgatum L. Weedy places in grassland. Old foundations and bottom of reservoir.
Lychnis alba L. In grassland and depressions. Common in Ammophila grassland.
Sagina procumbens L. Tension line near the wharf.
Spergularia rubra (L.) Presl. Tension line in the wharf area.
Stellaria graminea L. General in grassland.
S. media (L.) Cyrill. Under the back porch of the East Cottage. Rare.

Ranunculaceae

Ranunculus acris L. Locally in grassland.
R. Cymbalaria Pursh. Abundant in the mud, South Pond. (Not found at Tern Pond.)

Cruciferae

*Armoracia lapathifolia Gilib. Beside shack, n. of East cottage.
*Barbarea vulgaris R. Br. Old foundations north of the wharf.
Brassica juncea (L.) Cosson. Locally in grassland.
*B. Kaber (DC.) Wheeler, var. pinnatifida (Stokes) Wheeler. Grassland around Typha Pond.
Cakile edentula (Bigel.) Hook. Tension line on west shore and at Typha Pond.
Lepidium virginicum L. Grassland. Common.
Raphanus Raphanistrum L. Around South Pond.
Sisymbrium altissimum L. East shore around cottage.
S. officinale (L.) Scop., var. leiocarpum DC. Around East cottage, foundations of west cottages and the bottoms of the reservoirs.

Rosaceae

Fragaria virginiana Duchesne. Grassland on east and west slopes.
Potentilla argentea L. Grassland around East cottage.
*P. pacifica Howell. Gravel beach around South Pond. Very rare.
Prunus serotina Ehrh. Grassland n. of Typha Pond. Suckers only, 4 feet tall. Dead twigs also only that high. (Not reported from south end of island as formerly.)
Rosa rugosa Thunb. Large patches in grassland, eastern shore.
Rubus flagellaris Willd. (*R. procumbens* Muhl.). Large areas covered in upland grassland.
R. frondosus Bigel. Around Dry Pond. (None on Tub Point as in the last survey.)
R. laciniatus Willd. Large thickets in hollow west of the Reservoir. (None on Tub Point as previously.)

Leguminosae

Lathyrus japonicus Willd. var. glaber (Ser.) Fern. (*L. maritimus* Bigel.). Rare. Gravel beach around South Pond.
Trifolium hybridum L. Grassland near Tern Pond. Rare.
T. pratense L. Grassland. Not common.
T. repens L. Grassland. East slope. Not common.
*Vicia angustifolia Reichard. Grassland around East cottage.
V. tetrasperma (L.) Moench. Edge of grass and depression in cliffs, near Typha Pond.

Oxalidaceae

Oxalis stricta L. Common in grasslands.

Euphorbiaceae

Euphorbia polygonifolia L. Sandy area on the Neck.
E. supina Raf. Sandy area around east shore and the wharf.

Callitrichaceae

Callitriche heterophylla Pursh. Mud of Typha Pond.

Anacardiaceae

*Rhus copallina L., var. latifolia Engler. Edge of grassland and beach, just s. of wharf.
R. radicans L. Occasionally on grasslands. Not common.
R. typhina Torner. Hillside area near the East cottage. With pines and maples.

Vitaceae

Parthenocissus quinquefolia (L.) Planch. (*Psedera quinquefolia* (L.) Greene.). Over a shed, area near East cottage.
P. tricuspidata (Sieb. & Zucc.) Planch. Shed in hillside near the pines and maples. East cottage.

Aceraceae

Acer Pseudoplatanus L. Southwest of East Cottage. Grove badly damaged by hurricanes.

Hypericaceae

Hypericum mutilum L. Typha and Leper Ponds.
H. perforatum L. Grasslands at East cottage and Tub Point.

Onagraceae

Ludwigia palustris (L.) Ell., var. americana (DC.) Fern. & Grisc. (*Isnardia palustris* L.). Mud of Typha Pond.
Oenothera biennis L. Grassland in vicinity of the Neck.

Haloragidaceae

Myriophyllum pinnatum (Walt.) BSP. (*M. scabratum* Michx.). Shallow water and mud of Typha and Leper Ponds.

Umbelliferae

Daucus Carota L. Grasslands, everywhere.
Ligusticum scothicum L. Tension line. Not common.

Ericaceae

(Determinations verified by Dr. E. T. Wherry, University of Pennsylvania.)
*Kalmia angustifolia L. One colony in grassland.
*Vaccinium atrococcum (Gray) Heller. Rare. Grassland, central part of main island.

Primulaceae

Anagallis arvensis L. Common. Grasslands and beaches.

Oleaceae

Ligustrum vulgare L. Near cottage on East shore and the foundations on west shore. The tops of the bushes have been killed.

Convolvulaceae

*Convolvulus sepium L., var. communis Tryon (*C. sepium* L.). Base of grassy hillside, Tub Point.

C. SEPIUM L., var. AMERICANUS Sims (*C. sepium* L., var. *pubescens* (Gray) Fern.). Grassland along west coast. Marshy area at the Neck and South Pond.

*CUSCUTA POLYGONORUM Englm. Dry Pond. On *Polygonum punctatum* Ell. Identified by Dr. Truman Yuncker.

LABIATAE

GLECHOMA HEDERACEA (L.) Trevisan. In Ammophila grassland, n. of East cottage.

LEONURUS CARDIACA L. Edge of grassland and beach, east side of the island.

LYCOPUS UNIFLORUS Michx. Typha and Leper ponds.

*MENTHA ARVENSIS L. Marshy area at the Neck.

NEPETA CATARIA L. Grassland, east slope. Also in a mass of dead eel-grass.

SCUTELLARIA GALERICULATA L. (*S. epilobiifolia* Hamilton). Typha Pond margin.

TEUCRIUM CANADENSE L. (var. LITTORALE (Bickn.) Fern.). Grassland generally, in Ammophila area on west shore. Marsh area at the Neck and the border of South Pond.

SOLANACEAE

DATURA STRAMONIUM L. Tension line between beach and grass, area from wharf to East cottage.

SOLANUM NIGRUM L. Common in grassland all over the island.

SCROPHULARIACEAE

*LIMOSELLA SUBULATA Ives. Mud of Typha Pond. (Det. checked by Dr. F. W. Pennell.)

LINARIA CANADENSIS (L.) Dumont. Tension line around the island.

LINDERNIA ANAGALLIDEA (Michx.) Pennell (*Ilysanthes inaequalis* (Walt.) Pennell). Mud of Typha Pond, under the grass or the sedge. (Det. by Dr. F. W. Pennell.)

VERBASCUM THAPSUS L. Locally in grasslands.

PLANTAGINACEAE

PLANTAGO LANCEOLATA L. Grasslands from the beaches to hilltop.

P. MAJOR L. Marshy area at the Neck and Typha Pond.

RUBIACEAE

GALIUM TINCTORIUM L. (*G. Claytoni* Michx.). Leper, South and Typha Ponds. (*G. trifidum* of 1923 survey changed by Dr. J. M. Fogg, Jr. to this species on sheet in University of Pennsylvania Herbarium.)

Caprifoliaceae

Lonicera japonica Thunb. Near cottage foundations on the west slope. Small patches.

Sambucus canadensis L. Common. Large thickets in depressions in grasslands and along stone walls.

Campanulaceae

*Triodanis perfoliata (L.) Nieuw. (*Specularia perfoliata* (L.) A. DC.). Tension line. Rare.

Compositae

Achillea Millefolium L. Tension line and grasslands. Common.

*A. Millefolium L. forma rosea Rand & Redfield. Grassland beside the East cottage.

Ambrosia artemisiifolia L. Tension line, the Neck and Tub Point.

Bidens connata Muhl. Marshy area near the Neck, Typha Pond and bottom of reservoir.

Chrysanthemum Leucanthemum L., var. pinnatifidum Lecoq & Lamotte. Grasslands. Common.

Cirsium arvense (L.) Scop. Locally in grass and tension line.

C. vulgare (Savi) Tenore (*C. lanceolatum* (L.) Hill.). Grasslands throughout, not common.

Coreopsis lanceolata L. Near the foundations on west shore. Rare.

Erechtites hieracifolia (L.) Raf. Common in marshy area near the Neck.

Erigeron canadensis L. (*Leptilon canadense* (L.) Britton). Grasslands and tension line, mainly on Tub Point.

E. pusillus Nutt. (*Leptilon pusillum* (Nutt.) Britton). In weedy patches in grasslands and along tension line.

*E. strigosus Muhl. Grassland, depression on hilltop of Tub Point.

Gnaphalium obtusifolium L. (*G. polycephalum* Michx.). Common all along shore and in grasslands.

*Solidago graminifolia (L.) Salisb., var. Nuttallii (Greene) Fernald. Grassland, west slope and south-east of reservoir. Not common.

S. rugosa Mill. Grasslands. Common.

S. sempervirens L. Common in grasslands and tension line above beaches.

S. tenuifolia Pursh. (*Euthamia tenuifolia* (Pursh) Greene). Grassland around reservoir.

Sonchus asper (L.) Hill. Common generally over the island. Grasslands and tension line.

S. oleraceus L. Gravel bar, east side of South Pond.

The following plants have been collected on Penikese Island in the past, but were not found in 1947. They have been recorded in Dr. John M. Fogg's study of the Flora of the Elizabeth Islands.

Pteridophytes

Athyrium Filix-femina (L.) Bernh., var. Michauxii (Spreng.) Farwell.

Spermatophytes

Gramineae

Agrostis stolonifera L., var. compacta Hartm.
Bromus secalinus L.
B. hordeaceus L.
Digitaria sanguinalis (L.) Scop. Jordan's List.
Distichlis spicata (L.) Greene.
Echinochloa Crusgalli (L.) Beauv.
Festuca elatior L.
Panicum meridionale Ashe.
Poa annua L.
Setaria viridis (L.) Beauv. Jordan's List.

Cyperaceae

Carex hormathodes Fernald.
C. scoparia Schkuhr.
Eleocharis acicularis (L.) R. & S.
E. obtusa (Willd.) Schultes.

Juncaceae

Juncus articulatus L. (Reported as *J. debilis* Gray in Rhodora 26: 223, 1924.)
J. Greenei Oakes & Tuckerm.
J. pelocarpus Mey. Jordan's list.

Liliaceae

Lilium tigrinum Ker.
Smilax rotundifolia L.

Iridaceae

Sisyrinchium atlanticum Bickn.
S. montanum Greene (*S. angustifolium* of authors, not Mill.).

Salicaceae

Salix discolor Muhl. Jordan's List.

Betulaceae

Betula populifolia Marsh. Jordan's List.

Polygonaceae

Polygonum aviculare L.
P. Convolvulus L.
P. Persicaria L.
Rumex obtusifolius L. Jordan's List.

Chenopodiaceae

Atriplex arenaria Nutt. Jordan's List.
Salicornia europaea L. Jordan's List.
Suaeda maritima (L.) Dumort. Jordan's List.

Amaranthaceae

Amaranthus retroflexus L.

Caryophyllaceae

Arenaria peploides L., var. robusta Fernald.
Dianthus barbatus L.
Gypsophila paniculata L.
Spergula arvensis L. Jordan's List.
Spergularia leiosperma (Kindb.) F. Schmidt.

Portulacaceae

Portulaca oleracea L.

Ranunculaceae

Ranunculus flabellaris Raf. (*R. delphinifolius* Torr.)

Cruciferae

Brassica nigra L.
Capsella Bursa-pastoris (L.) Medic.
Raphanus sativus L.

Rosaceae

Amelanchier oblongifolia (T. & G.) Roem.
Fragaria vesca L. Jordan's List.
Potentilla norvegica L., var. hirsuta (Michx.) Lehm.
P. canadensis L. (*P. pumila* Poir.)
Rosa palustris Marsh.
Rubus canadensis var. pergratus (Blanch.) Bailey. (*R. pergratus* Blanch.)

Leguminosae

Trifolium agrarium L.
T. arvense L.
Vicia Cracca L.

Geraniaceae

Geranium carolinianum L.

ACERACEAE

ACER PLATANOIDES L.

MALVACEAE

MALVA NEGLECTA Wallr. (*M. rotundifolia* L.)

VIOLACEAE

VIOLA FIMBRIATULA Sm.

ONAGRACEAE

OENOTHERA GRANDIFLORA Ait.

UMBELLIFERAE

COELOPLEURUM LUCIDUM (L.) Fernald. Jordan's List.

ASCLEPIADACEAE

ASCLEPIAS INCARNATA L., var. PULCHRA (Ehrh.) Pers.
A. SYRIACA L.

CONVOLVULACEAE

CONVOLVULUS ARVENSIS L.

LABIATAE

LYCOPUS AMERICANUS Muhl.

SOLANACEAE

SOLANUM ROSTRATUM Dunal. Collected by Hollick.

SCROPHULARIACEAE

DIGITALIS PURPUREA L.
LINARIA VULGARIS Hill.

PLANTAGINACEAE

PLANTAGO MAJOR L., var. INTERMEDIA (Gilibert) Dcne.

CUCURBITACEAE

CUCURBITA MAXIMA Duchesne.

COMPOSITAE

ASTER ERICOIDES L. (*A. multiflorus* Ait.)
A. UNDULATUS L.
A. VIMINEUS Lam.
ANTHEMIS COTULA L.
GNAPHALIUM ULIGINOSUM L.
HELIANTHUS ANNUUS L.
IVA ORARIA Bartlett.
LEONTODON AUTUMNALIS L., var. PRATENSIS Koch.
RUDBECKIA HIRTA L.
SOLIDAGO CANADENSIS L.

S. JUNCEA Ait.
S. NEMORALIS Ait.
SONCHUS ARVENSIS L.
TANACETUM VULGARE L.
TARAXACUM OFFICINALE Weber.
XANTHIUM ECHINATUM Murr.

UNIVERSITY OF PENNSYLVANIA

POTAMOGETON BICUPULATUS IN MASSACHUSETTS.—During the summer of 1947, as complete a collection as possible was made of the vascular plants of the township of Petersham, northwestern Worcester County, Massachusetts. Upon identification, one of the pondweeds was found to be *Potamogeton bicupulatus* Fernald.

The species was first described by Dr. M. L. Fernald (*The Linear-leaved North American Species of Potamogeton*) from material taken in the mountains of Pennsylvania and Tennessee. The type-specimen was collected by Garber in Lehigh County, Pennsylvania in 1866. There is one record of the plant taken in Lake Dunmore, Vermont, which has never been corroborated.

The specimens from Petersham were taken from Harvard Pond (formerly Meadow Water Pond), an artificial pond created many years ago to operate a mill with the run-off from Tom Swamp. It is nowhere very deep and an abundant growth of all types of aquatic vegetation almost obscures the pond toward its margin. *P. bicupulatus* was found on the low mud-flats exposed by the low water of the pond. Probably in a summer of more abundant rainfall, these would not be exposed. Accompanying the *Potamogeton* were *Myriophyllum humile* (Raf.) Morong. and *Utricularia gibba* L.—C. EARLE SMITH JR., Harvard University.

FORMS OF CORNUS CANADENSIS IN MINNESOTA.—Field observations attendant to collecting, supported by a study of herbarium specimens, warrant the segregation of Minnesota material of *Cornus canadensis* L. into a few ecological variants, differing vegetatively from the typical form conceived as plants with simple stems with apparent apical whorls of leaves.

CORNUS CANADENSIS L. f. RAMOSA Lepage is characterized by the development of leafy branches either in the axils of the leaves

constituting the normal whorl, or below the whorl. The following collections are referable to this form: high and heavily glaciated granite ridge near Bass Lake, north of Ely, St. Louis Co., Aug. 30, 1936, *J. B. Moyle*, no. 2394, reported in Rhodora **40:** 276, 1938, as *Cornus suecica* L., which does not occur in the state; talus-slope of Mt. Mary, Ilgen City, Lake Co., Sept. 16, 1945, *Lakela* no. 6242; jack pine forest, 6 miles south of Gilbert, St. Louis Co., June 25, 1939, *Lakela* no. 3045; mixed forest on 60-acre island, Island Lake, 20 miles north of Duluth, June 16, 1944, *Lakela* no. 5536; sandy ridge south of Lake Itasca, July 9, 1928, *C. O. Rosendahl* no. 5648; Bowstring, Itasca Co., July 1925, *H. E. Stork* no. 1101, one plant on the sheet with the typical form; exposed outcrop northeast of Palmers, St. Louis Co., July 20, 1947, *Lakela* 6933a.

Cornus canadensis L. f. medeoloides Lepage was based on plants with two successive whorls of leaves, the uppermost developing by extension of the stem above the normal verticil, in contrast to Lepage's f. *infraverticillata* in which the additional verticil of leaves replaces the bracts below the normal leaves. The following collections are referred to the former category: bog-forest, north end of Decodon Pond, Anoka Co., Aug. 2, 1933, *M. F. and H. F. Buell* no. 672; T. 65, R. 19, St. Louis Co., Sept. 16, 1936, *W. Webb*; tamarack swamp, Hennepin Co., May 1891, *F. H. Burglehaus* (one double verticillate plant with four typical). Inconsistent with this concept is the following collection: west-facing slope of the Great Laurentian Highland Divide, ½ mi. east of Highway 53, St. Louis Co., *John W. and Marjorie F. Moore* no. 10339, two double-verticillate plants arising from the common rootstock with the typical plants.

A variant bearing more than one inflorescence per erect stem appears to be undescribed. Growing with the typical form were found plants which bear above the normal verticil of leaves two to three peduncles with inflorescences, cymose-fashion, the central one more mature than the lateral ones. Sometimes the lateral peduncles are twice as long as the central one, six to three centimeters, respectively. One of the flowering peduncles may be aborted or replaced by a leafy branch. Some plants bear leafy branches below the normal whorl of leaves, reminiscent of f.

ramosa which was not based on plants with multiple peduncles. The variant is herewith described as

Cornus canadensis L., f. **florulenta,** f. nov., differt a f. *typica* 2–3 pedunculis floriferis vel ramulis foliosis super foliorum verticillum gestis. Type: *Lakela* no. 6933, July 20, 1947, growing in moss- and lichen-mats on flat rocks within the railroad right-of-way 1 mi. northeast of Palmers, St. Louis Co., Minn. (Univ. of Minn. Herb. Minneapolis).

The form differs from the typical form by the development of two to three inflorescences on distinct peduncles in axils of leaves constituting the usual whorl. The collection of Dr. Thomas S. Roberts, Aug. 6, 1879, Poplar River, Cook Co., Minn., (Univ. Minn. Herb. Mpls.) is referred to this form.—Olga Lakela, University of Minnesota, Duluth Branch.

Volume 50, no. 599, conisting of pages 253–284 and plate 1118, was issued 5 November, 1948.

ERRATA

Page 17, line 23; *for* Basiliensis *read* Brasiliensis.
Page 17, line 30; for *Shortiana* read *Shortii*.
No. 590, Contents, line 9; *for* Lampylium *read* Campylium.
Page 63, line 11; *for* CARUNCULATA *read* **carunculata.**
Page 166, line 15; *for* sugbenus *read* subgenus.
No. 599, Contents, line 4; *for* 270 *read* 269.
No. 599, Contents, line 6; *for* 279 *read* 280.
No. 599, Contents, line 9; *for* 283 *read* 284.
Page 276, line 32; *delete* (Fig. 1).
Page 276, line 33; *delete* (Fig. 2).

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